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ABSTRACT

The document presents a conceptual framework and program plan for R&D in career education prepared for the National Institute of Education, based on a fundamental premise that R&D requires a focus on operationally definable problems. The focus suggested is the responsiveness of career education to the problems experienced by individuals as they interact with the labor market. A framework for R&D is established by tracing the connections between three major labor market problems--unemployment, low-income employment, and alienation in employment--and career education interventions that might ameliorate these problems for various population groups. Using this framework, some ongoing career education projects (school-based, employer-based, home-based and residential) are examined to determine what changes and additional efforts are needed. A program plan is derived with four basic components: analytical activities, modification of continuing projects, new efforts, and evaluation. Approximate budget proportions and staffing requirements for carrying out the program are suggested, together with alternative organizational and management strategies. (A 103-item bibliography is included.) (Author)

CAREER EDUCATION: AN R&D PLAN

ED 089106

PREPARED FOR THE NATIONAL INSTITUTE OF EDUCATION,
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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PREFACE

This report was undertaken at the request of the National Institute of Education (NIE), which has responsibility for the Career Education Program.

Career education was initiated in 1971 as a programmatic activity by Assistant Secretary for Education (then Commissioner) Sidney P. Marland, Jr. Through the reform of secondary schooling, guided by research and development (R&D) sponsored by the Office of Education, each student was to graduate from high school with marketable skills, prepared to go either into higher education or into immediate employment. But the nature of the reform was not specified. As Secretary Marland stated: "Apart from the general notion that revolves around preparedness (for work, for leisure, for the manifold opportunities open to each of us, in truth, human fulfillment intellectually and occupationally) we have conscientiously avoided trying to lay down a precise definition for career education."*

The R&D program formulated by the Office of Education in response to this broad mandate concentrated on the development of four different approaches (models) for achieving career education goals: reform of traditional school-based education, education provided to adolescents directly by employers, education and guidance delivered to individuals in their homes, and education provided to families in a residential setting. A rather stringent schedule was established: Although funding did not begin until late in FY 1971, contractors were to be ready to test and install career education reforms by September 1972.

When the NIE came into existence in July 1972, the Career Education Program was one of several R&D programs transferred to the new agency from the Office of Education. Funding for it up to that point was approximately $26 million, including $15 million for the development of the four models in FY 1972. Because of the time requirements, most of

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*Quoted from "Career Education: A Report," *The National Association of Secondary School Principals Bulletin*, Vol. 57, No. 371, March 1973, p. 3.

the funds had been expended for operational activities. As a result, the NIE was faced with a program that included little R&D. Further, the lack of definition encouraged the use of many different concepts of career education by practitioners and researchers, which served to broaden the base of public and professional discussion but increased the difficulty of formulating an R&D plan. Therefore, the NIE sought outside help in analyzing career education concepts and developing program directions.

Rand's task, as assigned by the NIE, was to establish a conceptual foundation for the Career Education Program, identify some R&D alternatives, and develop appropriate research strategies for carrying out the suggested activities. The substance of the work had to be completed in six weeks in order to provide material for the NIE's use in its FY 1973 and FY 1974 program planning and budgeting. Both analysis and planning must continue if the NIE's Career Education Program is to contribute to the improvement of education and career success.

This report is merely a first step in the process of formulating an R&D program. It reflects two separate analyses: First, after developing a focus for R&D, we consider the context for career education and outline a conceptual analysis of problems and potential educational interventions concerning entry and advancement in the labor market. Second, we examine the program activities currently supported from two perspectives: systematic relationships among the major projects, and fit between the projects and the conceptual analysis. From an integration of the conceptual analysis with the examination of current activities we derive the program and budget plan. Recommendations for carrying out the program plan are developed on the basis of our experience and study of organizational and management practices in other federal R&D agencies.

The reader interested in career education may find the first three sections of the report of greater interest than the last two. The concluding sections are, in conformance with the NIE's specific request, concerned with the details of R&D management and hence relevant to administrators and performers of federally funded research in education and related fields.

SUMMARY

This report provides a conceptual framework for R&D in career education, examines some currently supported activities as they relate to that framework and as sources for further work, and derives from these two sources a possible program plan and some R&D strategies for the NIE Career Education Program.

FOCUS

A fundamental premise guiding our analysis and planning for the Career Education Program has been that, to be successful, programmatic research and development must be focused on clear, operationally defined problems. The recommended focus for the NIE Program is *the responsiveness of career education to the problems experienced by individuals as they interact with the labor market.* Although objectives not related to work may be quite appropriate for career education as a general reform movement in schooling, this specific focus appears most pertinent for the NIE Program because:

- Its resources are limited, therefore the Program must concentrate on priority issues.
- Economic careers are of primary concern to individuals and to the nation; they are also a source of noneconomic benefits.
- The economic sector of society and individual careers within it are better understood, and that understanding is built on a better knowledge base, than is the case for other aspects of societal or individual activity.

A CONCEPTUAL FRAMEWORK

An important first step in developing a program plan is to analyze the dimensions of the problem to be investigated. The conceptual analysis, summarized in Section II, attempts to trace the connections between problems arising from labor market processes and possible R&D

activities within the domain of career education. Three major labor market problems are identified: *unemployment, low-income employment,* and *alienation in employment.* Possible career education objectives with respect to these major problems are of two kinds in each case: helping to reduce the overall *level* of the problem and changing the *distribution* of those affected by the problem among various population groups. Differently formulated educational programs appear to be appropriate for level problems and for distributional problems.

The analysis takes into account that the potential role of education in ameliorating the problems ultimately depends on the nature of the labor market, particularly the degree to which it is constrained by employment procedures, legal restrictions, and discriminatory practices. Specific difficulties arise for individuals at two stages: *entry* into the labor market, and *progress* within it. Among possible entry-level problems are lack of specific or general skills, lack of credentials, personal constraints, breakdowns in the matching of people and job opportunities, and unrealistic job aspirations. Similar problems can be identified in the area of career progression.

For each potential problem, we hypothesize some causes and suggest R&D initiatives in career education that could serve as possible remedies. For example, if lack of skills is a reason for failure to advance, we might explore the hypothesis that this resulted from lack of exposure to the necessary training, which, in turn, might be explained by one of several subhypotheses: (1) absence of appropriate programs, (2) lack of openings in existing programs, (3) lack of knowledge of training opportunities, or (4) lack of funds. The first could be addressed by initiatives creating correspondence courses, night school programs, and the like; the second and fourth, by government subsidy to accommodate more participants; and the third, by a variety of informational and guidance activities.

Through the conceptual analysis, we establish limits for a career education program by identifying problem causes that are outside--as well as within--the capability of educational intervention. Additional limitations are imposed by lack of knowledge. There is sufficient understanding and experience to permit some confidence in recommending

educational experimentation for meliorating entry-level problems and, to a lesser extent, for career-progression problems. But with respect to work-related alienation, the first R&D task is to develop a better understanding of the problem (who is affected, what is the nature of the dissatisfaction, when does it occur?).

THE CAREER EDUCATION MODELS

We next examine the career education models projects, formerly supported by the Office of Education and inherited by the NIE, in order to determine what changes and additional efforts are needed. When assessed against the background of the conceptual framework, the current projects appear to address only a few subquestions related to job-entry problems. Little of the work concerns problems of dead-end jobs for mature workers or distributional problems associated with career entry or career progression.

Each of the model concepts is explored rather incompletely through the existing projects. The school-based Model I project has undertaken curriculum development as its major reform strategy in the absence of a focused definition of career education. The employer-based Model II projects have as yet failed to examine the assumptions on which the model is based, namely, that employers will be willing to provide an adolescent's total education, and that this education is more suitable than school. The Model III project deals with only one component of home-based education, the information and guidance functions. The residential project (Model IV), which works with families, does not appear to be developing cost-effective strategies.

The examination also reveals some major difficulties common to all the projects: a strong bias toward operations, with little emphasis on research and analysis; absence of common variables and coordinated variations; little concern with implementation strategies; a narrow range of types of contractors; and lack of a systematic plan for evaluation.

BASIC PROGRAM COMPONENTS

The proposed program plan outlined in this report includes R&D initiatives derived from the conceptual analysis and suggestions for

improving and extending the Models Program. The plan has four basic components:

1. *Continuing Analysis*
   - o Support efforts to complete the conceptual framework begun in this report and identify additional priority issues.
   - o Continue the assessment of current and anticipated career education projects to develop additional sources and tests of relevant program hypotheses.
2. *The Models Effort*
   - o Reduce the number of variables by concentrating on adolescents as the main population group.
   - o Introduce more systematic variation to allow comparisons within and among projects.
   - o Develop strategies in each major experiment for wider application of successful practices.
   - o Support the research and analysis needed for effective design of experimental projects.
3. *Additional Activities*
   - o Pursue directions implied by the conceptual analysis, for example, projects addressed to career-progression problems.
   - o Support selected field-initiated projects.
4. *Evaluation*
   - o Give greater emphasis to the formative and summative evaluation of individual projects.
   - o Provide mechanisms for comprehensive evaluation within each Career Education model.
   - o Support cross-comparisons of the four models.
   - o Sponsor evaluation of exemplary career education projects not funded by the NIE.
   - o Develop strategies to assess the progress and achievement of the overall Career Education Program. In this

regard, appropriate indicators include the contributions of the Program to knowledge and improved policy formulation in career education, and the ability of the Program to develop successful educational innovations.

A program plan should be reflected in budget priorities. We consider the budget from two perspectives: the balance among different types of R&D supported, and the proportions allotted to the substantive program activities. An assessment of the needs of the Career Education Program leads us to suggest that about 15 percent of the budget for FY 1974 be allocated to research and analysis, about 60 percent to development and experimentation, and about 25 percent to evaluation. In terms of program activities, the suggested approximate proportions are 80 percent for the models effort (50 percent for continuing current projects, 30 percent for new projects to extend the models) and 20 percent for new thrusts derived from the conceptual analysis. The proposed program plan and budget proportions are based on a strategy of concentrating R&D resources on a few themes, while investing a portion of the funds in new ideas. Overall proportions might well change in the future as funding levels and/or program themes change.

IMPLEMENTING THE PROGRAM PLAN

The Career Education Program's ultimate success depends on the policies that guide its organization and management. We recommend several operating guidelines. The Program should:

- Strive to support a mixture of performers from a variety of disciplines and institutions.
- Provide limited and carefully controlled institutional support, but maintain continuity in project support, given adequate performance.
- Provide some support to short-term projects that have a high probability of success.
- Fund experimentation to be performed by skilled practitioners who can achieve success in career education, and let invention

lead research by investigating the determinants of such success.

- Concentrate its resources on R&D, leaving the funding of widespread implementation of career education innovations to others.

In addition to these general management policies, R&D program administration must develop successful strategies for project generation: how to identify relevent sources of ideas, provide appropriate staff and field interaction, and frame Requests for Proposals for different purposes. Procedures for proposal selection and for project monitoring must be adapted to the objectives of each Program component, i.e., whether proposals or projects are aimed at research, policy analysis, development, experimentation, or evaluation. In the final section of the report, after examining several alternatives for Program organization, we suggest that the Career Education Program be organized by types of R&D to guarantee requisite flexibility. To ensure adequate Program leadership and control, we estimate that the Career Education Program will need a minimum of 50 professional staff members, assuming a budget of $25 million. Of particular importance is an internal analytical unit that will provide the Program with a continuing capability for policy analysis.

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I. INTRODUCTION

THE NEED FOR FOCUS

The purpose of this report is to design a plan for supporting research and development (R&D) in career education.

Planning an R&D program in any field is a difficult undertaking. It is particularly difficult in career education for, in this case, the R&D plan must attempt to provide a sound empirical and experimental base for a general reform movement. The public and professional meanings attached to this reform movement are varied and ambiguous. The adherents of career education use definitions ranging from a narrow interpretation--job training--to the broadest possible meaning--the education needed by each individual to make possible a satisfying and successful life. Although ambiguity and diversity during the initial phases of attempted educational reform can be expected and may even be valuable in stimulating debate, they hinder sound R&D planning. The difficulty can be reduced, however, by choosing to focus on selected priority issues. The choice of whether or not to provide this focus is the first basic decision in designing an R&D plan. We strongly suggest that the NIE Career Education Program *focus on a specific problem area* for several reasons:

- Any design effort in education is so complex that, even when the problem addressed has a fairly narrow focus, considerable intellectual and financial resources must be invested to achieve any measure of success. When the problem definition becomes diffuse, resources are likely to be scattered and dissipated without effecting noticeable change.*

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*Indeed, this tendency is observable in the current projects of the Career Education Program (see Section III).

- Most successful R&D plans start with a clear definition of one problem, or a small number of problems if they are closely related.*
- Career education in its broader definitions subsumes not only the total area of concern of the NIE, but those of other agencies--federal and local--concerned with education, employment, and R&D. In order to make a case for the existence of a special program activity within the NIE labeled "Career Education," a focus that is unique to that activity and that unifies its sponsored R&D projects is necessary. Further, any feasible R&D strategy must define rules for exclusion as well as for inclusion.

SELECTING A FOCUS

The second basic decision in designing an R&D plan is selection of the problem area on which to focus. This selection should be based on a consideration of the relative importance of the various problems that might be investigated. Assessing problem importance involves answering a number of questions, including, for example: Who thinks the problem is important? Why is it considered important? How many individuals does it affect? What is the nature of the injury or disservice done to those affected? What are the overall societal effects of this injury? The selection of a focus should also be based on a consideration of constraints, such as limits on the ability

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*For example, the NSF curriculum improvement program, usually cited as one of the more successful education development efforts, originally addressed a relatively simple problem: updating the science and mathematics curricula of secondary schools to reflect the current state of these disciplines. Elaborations were introduced later; for example, emphasis on experience-based curricula, investigative styles of teaching and learning, and extensions above and below the high school level. Better understanding of implementation strategies led to teacher training programs dealing with the new curricula. The problem focus, however, remained unchanged. In research and development in the natural sciences and in engineering as well, questions are usually framed quite specifically, and design problems are formulated around a stated objective that can be evaluated by explicit or implicit assessment.

of the educational sector to deliver possible solutions, and components of the problem that are not amenable to an R&D approach.

Considering questions such as these has led us to limit career education to its literal meaning:

> *Career:* "an occupation or profession engaged in as one's life work,"* that is, the productive activity of individuals within the economic sector.
> *Education:* the acquisition of knowledge and development of special and general abilities. Therefore,
> *Career education:* the development of knowledge and of special and general abilities to help individuals in their interaction with the economic sector.

We believe that, of all possible definitions of career education, this is the most viable for the NIE Career Education Program for the following reasons:

- An individual's economic career is a very important part of his life, both in terms of time spent and in terms of his conception of the success and satisfaction that his life affords him. Economic self-sufficiency affects his entire life style, including status, gratification of personal desires, association with others, and political and social activities.**
- The economic sector is a major subject of national concern and governmental activity, since its performance determines to a large extent national and individual well-being.

Webster's Third New International Dictionary.

**This is increasingly true for women as well as men. According to the U.S. Census Bureau, 40 percent of the labor force in 1970 was made up of women. Even for those not rewarded in money terms, meaningful productivity (in home and family, as volunteer) tends to be at the core of life satisfaction.

- Public demand calls for the educational system, formal and informal, to deliver the skills necessary for economic viability. In a recent Gallup Poll of adults, the following rated first and third in a listing of goals of education: to obtain better jobs--44 percent (highest percentage); to achieve financial success--38 percent (third highest percentage).* Young people also--with some possible exceptions among the disaffected urban poor and upper-class affluents--look toward their education to furnish them with the ability to obtain good jobs.** Educators are also committed to this concept of education, as a recent resolution by the Council of Chief State School Officers shows.†
- There is a sizable data base on the interaction between individuals and the economic sector--who is employed at what job receiving what pay, who is having difficulties, the numbers involved in various desirable and undesirable job categories, projections, and so on. Further, there is sufficient understanding of this interaction to allow the framing of reasonable hypotheses concerning the nature of problems and possible avenues of amelioration. The existence of a conceptual framework and a data base makes the formulation of an R&D plan feasible. Absence of these two conditions reduces R&D activity to scattered ad hoc experimentation.

In addition to these considerations that appear valid for the Career Education Program as a whole, there is also the fact, pertinent to this report, that we were specifically requested to look at the process by which people enter, exit, and advance in the labor market, and the role of education in facilitating that process.

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*Reported in *Phi Delta Kappan*, September 1972, p. 33.

**A variety of measures support this conclusion, such as survey data, interviews, inventories of concerns or desires, projective tests, and reports of adults who deal with young people.

†The Career Education resolution, part of a set of policies passed in November 1972, states ". . . preparation for careers should be a basic policy of education."

The recommendation that the NIE Career Education Program initially have an economic focus is not meant to imply that this focus is fixed for all time. As problems are ameliorated or new priorities develop in career education, the research agenda of the NIE Program must evolve accordingly. Career education, as a reform movement, has significant implications for a range of educational and social issues including alienation toward school, noneconomic aspects of adult careers, and basic values and attitudes toward work. An initial economic emphasis need not prevent such problems from emerging as future R&D foci for the NIE.

CONCEPTUAL ANALYSIS

The third basic step in designing an R&D plan for Career Education is the *conceptual analysis*--decomposing the overall problem into separate subproblems that can be addressed by R&D activities. The purpose of the conceptual analysis is to build a framework for thinking about career education problems. The framework is useful for understanding the relationships among subproblems, recognizing the significance of new ideas when they occur, and indicating where R&D effort should be concentrated. Conceptual analysis is also a means of generating research hypotheses. To demonstrate what conceptual analysis is and to provide a structure for our planning effort, we devote part of the report to a *conceptual framework* for the NIE Career Education Program. This framework, as indeed any conceptual framework, should be considered unfinished; it should be continually refined and reformulated to account for new results and new problems as they occur.

EXAMINATION OF ONGOING ACTIVITIES

The current NIE Career Education Program has inherited a portfolio of ongoing activities from the Office of Education, and any R&D plan for the Career Education Program will have to build on this foundation. The inherited projects generally fall within the focus that we have selected in this report; thus, a program direction has already been set

that is compatible with an operable definition of career education. Another reason for not starting anew is that preparation for an R&D plan is greatly facilitated by having a concrete body of activities to draw upon for ideas and opportunities. Generating completely new ideas through analysis and other theoretical exercises would not only be more difficult but might result in an impractical plan.

Therefore, a fourth step in preparing an R&D plan for Career Education is to *examine the current portfolio of activities* (which, in the NIE Program, consists primarily of projects oriented around four career education models) to determine what projects should be continued, modified, or terminated, and what new projects should be added to exploit the existing formulations. The conceptual framework is useful in conducting this investigation. Examining the current activities leads us to suggest some major alterations.

PROGRAM PLAN

The fifth step in the preparation of an R&D plan for the Career Education Program should be to allocate the available budget to the program activities that are produced as a result of the previous four planning steps. Budget allocation requires determining the array of possible substantive elements and priorities among these elements to *design a program plan.*

However, planning of the possible activities has not yet reached the level of completeness where recommending priorities among them is feasible. More activities should be identified--more uniformly spanning the conceptual framework--and described in greater detail. But it is possible to recommend priorities among certain categories that are generic in planning any R&D program: the balance among types of R&D (research, policy analysis, development, experimentation, and evaluation), and the balance between new projects and continuing projects. These priorities help to establish the character of an R&D program and should influence the other steps of the planning process: selecting a focus, conceptual analysis, examination of ongoing activities, and priority setting among activities. Since planning an R&D program is

an iterative process, these other steps should also influence the priorities set among types of R&D and between new and continuing projects.

All the planning steps that have been discussed should be done simultaneously and interactively. Although we can state what the steps are in general terms, we cannot be specific about an analytical procedure that will lead automatically to a satisfactory budget plan. Successful budget planning necessarily involves recycling, reanalysis, and judgments that cannot be preprogrammed. At any point in time, any planning process will always exhibit some disagreement about ends and means that cannot be immediately resolved. Therefore, to develop a successful R&D program, the Career Education staff will have to establish a sound internal planning capability.

IMPLEMENTATION STRATEGIES

The sixth and final step in planning an R&D program is deciding on organizational and managerial strategies for *implementing the substantive plan*. Three aspects of implementation should be considered. First, a methodology must be developed for performing the operational parts of the R&D management process: project (idea) generation, project (or proposal) selection, project monitoring, project evaluation, and project utilization. Second, the Career Education Program is sufficiently large to require division of responsibilities among internal units of organization. Third, the quality of the Career Education Program will ultimately depend on the quality of the extramural community; thus, management strategies for improving the quality of the performer community need to be considered in implementing an Career Education Program plan. Our recommendations in regard to appropriate organizational and managerial strategies are derived from examinations of the practices of a number of government agencies* and the R&D management experience of one of the authors.

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*The agencies include the National Institutes of Health (Dental, Cancer, Heart and Lung, Allergy and Metabolic Diseases, Child Health and Human Development), National Institute of Mental Health, Office of Child Development, National Science Foundation, Office of Naval Research, Department of Agriculture, Office of Economic Opportunity, NASA/Goddard Space Flight Center, and the Air Force.

II. CONCEPTUAL ANALYSIS

OVERVIEW

The conceptual analysis presented here is an attempt to trace the connections between general statements of national problems toward which career education efforts may be directed and specific career education R&D activities. We focus on one class of national problems--those encountered by individuals in their interactions with the economic sector--and develop a conceptual framework within which relevant R&D activities may be organized. The analysis thus proceeds on two levels.

The first level concentrates on the economic context--some of the dimensions of the labor market--that must be considered in formulating career education programs. Since radical changes in the economic system are not in the domain of career education, the NIE Program must accept the major features of that system as constraints. At this level the analysis makes it possible to determine priorities in career education by identifying specific problems, affected populations, and the nature and severity of the disabilities incurred.

The second level of analysis pertains more specifically to the domain of career education. We attempt to identify those concerns that are appropriate to our limited definition of career education, to outline the range of relevant questions and hypotheses on which R&D can focus, to indicate the crucial assumptions that underlie major action alternatives, and to identify the extent to which R&D programs are likely to affect progress toward career education goals. However, to be useful in making program choices, the conceptual framework must be supplemented by empirical evidence and by further analysis from which probabilities can be derived for the various hypotheses and for the success of proposed interventions.

Three general observations on the analysis are in order. First, the conceptual framework is used to organize our thoughts about problems and interrelationships among problems and to direct our attention to potentially profitable lines of inquiry. If a particular framework helps to define issues and highlights planning possibilities, it serves

its purpose. The one suggested here is only one of a variety that could be developed, and there are no theorems that permit us to decide which is the best. Moreover, it is undoubtedly true that variations in the present framework will be required as we learn more about the problems and processes that are represented.

Second, the conceptual framework developed in this section is fragmentary and incomplete. This is due, in part, to time and resource constraints on the scope of our effort, which have forced us to leave parts of the framework to subsequent efforts. But many of the blanks represent gaps in our current knowledge and understanding of the issues and problems that confront career education.

Third, the framework, despite its fragmentation, contains a substantial number of R&D suggestions. We do not mean to imply thereby that all these suggestions are equally worthy of implementation, nor even that all are viable. We have attempted to make the framework as complete as possible, even incorporating notions outside career education concerns, in order to provide a context within which activities outside the Career Education Program (e.g., labor market research sponsored by the Department of Labor) can be systematically related to career education concerns. Furthermore, knowledge gaps can be fully exposed only by attempting to examine systematically all aspects of the framework.

THE CONTEXT OF CAREER EDUCATION

There are two broad strategies consistent with attempting to improve the interaction of individuals with the economic sector. One is to try to change the nature of the economic system. The other is to accept the system as it currently exists and attempt to provide individuals with the skills and knowledge that would enable them to pursue satisfactory careers within that system. In the definition of career education given in Section I we suggest the latter approach, because most dimensions of the economic system (e.g., the nature of productive activities, the acceptance of profits as a legitimate return) do not

appear to be directly susceptible to the influence of career education activities.* Education, on the other hand, can clearly have a significant impact upon the individual's ability to function effectively within the system.

Career Education Objectives

There are three major contemporary work-related problems toward which career education efforts should be directed:

1. *Unemployment*--career education activities can help ensure proper education and training so that individuals are able to qualify for the kinds of jobs they seek.
2. *Low-income employment*--career education should provide the education, training, and placement services that individuals need in order to avoid or progress from those jobs with little opportunity for growth in income.
3. *Alienation in employment*--career education can attempt to assist workers who are dissatisfied with their employment experiences and have few opportunities for change or growth.

We do not mean to imply that this is an exhaustive list of contemporary work-related problems. As understanding of the relationship between education and careers develops, additional work-related objectives of career education may well be recognized. There are many gaps in what is now known about the problems of unemployment and low-income employment, and, with the exception of some studies regarding the military, we seem to know little about alienation in employment and its distribution among workers and among jobs. Also, time brings changes in the demography of the labor force and in the distribution and nature of various kinds of productive activities. In sum, a variety of questions

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*The system may, however, be indirectly affected by educational interventions. If, for example, career education has an impact on a significant proportion of the labor force, the system may adapt itself to the resulting conditions in the labor market.

relevant to the overall objectives of career education remain unanswered: Are there other work-related objectives of career education? If so, what are they? Can they be operationally specified? Are there data available on the extent of the problems? Who is affected in what ways? And so on. *Accordingly, one aspect of the Career Education Program should be an ongoing examination of the problems of workers and employers to update old knowledge, fill in the gaps in our understanding, and recognize emerging work-related problems. Two issues are of high priority: obstacles encountered by today's adults, and obstacles likely to be faced by today's youth in the future.*

It should be emphasized that career education policymakers will need continuing data over time to guide their decisions for the future, to evaluate their progress, and, in general, to keep them informed of where they stand. They will be dependent for much of this data on outside agencies, e.g., the National Center for Educational Statistics, the Bureau of Labor Statistics, and the Census Bureau. And these agencies are not likely to procure, without guidance, precisely the information that career education decisionmakers will need. In support of the suggested problem examination, the NIE Career Education Program should sponsor an analysis of current data-gathering activities and institute a program to identify and fill data gaps and derive relevant syntheses. The annual Manpower Report of the President accomplishes many of these objectives and may suffice for the present, but it should be examined from the standpoint of specific data needed for career education.

Although this report suggests that career education focus on work-related problems, some exploratory efforts concerning problems usually considered outside this domain, but with conceivable impact on it, should also be considered. For example, do leisure activities affect job satisfaction? If so, how many persons currently lack the ability to make satisfying use of their leisure time? Are there disparities by race, income, sex, age, and so on with respect to individuals' abilities to engage in leisure-time activities that satisfy them? Does urban status exacerbate the problem? *Research in such areas must focus on conceptual issues, such as the generation of operational definitions of problems and objectives, and on attempts to build the knowledge base needed for operational, programmatic R&D efforts.*

Level versus Distributional Problems

There are at least two dimensions to each of the career education problem objectives listed above. On the one hand, career education could focus on the overall extent to which any of the objectives is achieved. For example, programs could be designed to help reduce the overall level of unemployment. On the other hand, the distribution of these problems among various population subgroups could be the focus of career education activities. Thus, programs could concentrate on reducing unemployment among youths or reducing the extent to which women are constrained to low-income employment, and so on.

These are not necessarily competing objectives. A career education program that succeeds in reducing the level of unemployment among youths, for example, may also thereby reduce the overall level of unemployment. There is considerable room for disparity, however, between *distribution* goals and overall *level* goals. Unemployment is not distributed equally between youths and adults. A career education program that succeeds in enhancing the employment opportunities of program participants may reduce the overall level of unemployment; but if the participants happened to be disproportionately adult, the overall reduction in unemployment would be accompanied by an increase in the disparity between age-specific unemployment rates. For that matter, a successful career education program to improve distributions of work-related benefits could, and in many cases would, mean making some people worse off. For example, a program that reduced alienation among blacks by providing them with greater access to more satisfying jobs could easily produce greater overall alienation by displacing whites or by arousing hostility over the "advantages" given to blacks.

The distinction between distributional and overall level goals becomes particularly apparent in the debate over "creaming." During the past few years many social action programs have been accused of serving those individuals in the target population who least need help and devoting little or no attention to those whose needs are greatest. For the majority of programs, creaming probably leads to a greater overall impact, but it also exacerbates the disparities between those passed over by the program and the rest of the world. In short,

creaming is "bad" if distributional goals are paramount, but may be desirable if level goals are ranked above distributional goals.

In essence, this issue reduces to the choice of target populations. Career education programs cannot hope to be all things to all people, even within the limited sphere of work-related objectives. Attempts to cover too wide a range of problems will lead to scattering of resources and fragmentation of programs. Therefore, choices must be made as to which kinds of individuals (e.g., those having certain kinds of problems) will be the focus of career education programs.

One possible choice, often implicitly made when programmatic R&D activities produce a workable program, is to help those who can be helped. As a result, it is the people who are most able to benefit from the successful program who receive the help. Therefore, even in the absence of conscious targeting, the choice of program is, in effect, a choice of target population. Moreover, since minor obstacles are more easily overcome than major ones, programs directed toward removing minor obstacles are more likely to prove successful. Hence, persons who encounter only minor obstacles are more likely to be the beneficiaries of programs, with "creaming" the often unintended result of program choice. This is not necessarily undesirable, but should be done only in full awareness of the effects of program decisions.

To the extent that unemployment, low-income employment, and alienation in employment are caused by systemic factors (e.g., the levels of aggregace demand, the structure of industry) outside its scope, the Career Education Program has little hope of substantially affecting their overall levels. Thus, the choice between level and distributional goals depends, in large part, on the extent to which problems are rooted in general economic conditions.

R&D activities have an important role to play in these decisions. What is the distribution of unemployment among various population groups? Who are the alienated employed? How are they distributed among various population groups? Among various jobs or occupations? To what extent do aggregate economic and social forces affect the overall level of unemployment? Of low-income employment? Of alienation in employment? As noted earlier, one reason for our proposed focus on work-

related objectives is based on the knowledge that we already have much of the information we need to answer such questions, although often in an unorganized and incomplete form.

Accordingly, we recommend that some research be directed toward the analysis and synthesis of what is now known about (1) the distributions and levels of unemployment, low-income employment, and alienation in employment; (2) the characteristics of the persons who encounter each kind of problem; and (3) the distributions of such persons in terms of the kinds of problems they face in trying to overcome obstacles to career success, and what can be done to remove or reduce those obstacles.

Structure in the Labor Market

For career education, the most important aspect of the economic system is the nature and extent of structure that exists in the labor market. Jobs are not undifferentiated. Rather, criteria are associated with each job such that competition for that job is limited to persons who satisfy the criteria. In addition to limits deriving from specific job characteristics, other barriers operate in the labor market. Common constraints are (1) skill requirements (e.g., persons who lack the ability to drive cannot compete for jobs as truck drivers); (2) credential requirements (e.g., persons who lack a driver's license cannot compete for jobs as truck drivers even though they may be skilled truck drivers), (3) discrimination (job competition is restricted on the basis of sex, race, age, and so on); (4) the existence of internal labor markets that constrain competition for one job to persons who have had other specific jobs (e.g., a person who has all the skills required to be an excellent foreman cannot compete for a foreman's job in a company that promotes from within--unless, of course, he happens to be working for that company); and (5) pressures on employers that may preclude their adjusting the parameters of a job to meet labor market conditions (e.g., minimum wage laws, union contracts, or social pressures may fix wages at levels higher than would prevail in a free market, keeping employers from adjusting to labor market conditions by reducing wages and expanding employment).

Some of these constraints are considered to be "natural" in the sense that they are inherent in the productive process (e.g., technology-based skill requirements.) Others are viewed as being "artificial" restrictions on the market, such as credential requirements, minimum wage laws, and the like. In either case, however, the implications for career education are the same, for the constraints identify the potential targets of career education activities. It is the individual's inability to meet the requirements associated with rewarding and satisfying jobs that underlies his or her inability to pursue a successful career. From this perspective, career education activities are viewed as attempts to provide individuals with the ability to overcome structural barriers to entry and advancement in a career. Detailed examination of these structural barriers is thus a means of identifying potentially efficacious career education interventions.

At the same time, some labor market constraints put severe limits on the ability of career education to ameliorate problems. Activity directed toward enhancing an individual's skills in a job for which he is not allowed to compete is wasted effort. For example, a person is likely to find training in one of the construction trades to be of little value unless he can gain entry into a union.

Since labor markets are structured in a variety of ways, and career education programs must be suited to particular problems, *we recommend that research be directed toward obtaining detailed information on the kinds of structural barriers that individuals encounter as they attempt to enter and advance in various labor markets. Specific first steps should attempt to integrate the research results already uncovered into a career education focus. This type of work should be coupled with the design of educational programs.*

CONCEPTUAL FRAMEWORK

The suggested conceptual framework for career education is based upon an analysis of structure in the labor market: the barriers or problems individuals encounter as they interact with it, possible causes for these problems, and programs or policies that might remedy them. The framework distinguishes between problems of entry into the work

force and problems of advancement in a career. Although some of the hypothesized causes and possible remedies appear to be similar for each set of problems, the substance of the issues addressed differs. Lack of skills may be a barrier to an individual's entry into the work force. It may also be a barrier to another individual's advancement beyond the entry level. Although the nature of the barrier is the same, the kinds of skills the first individual needs to acquire if he is to overcome the entry barrier are apt to be quite different from the kinds of skills needed by the second person to surmount the advancement barrier he faces.

We should point out that entry and career progression problems, though discussed separately below, are interrelated. The relationship between these problems is suggested by some of the structural issues mentioned above, for example, career ladders that establish certain job experiences as prerequisites for other jobs. Such internal labor market relationships suggest that one of the problems encountered by persons who lack advancement opportunities is that they entered at the wrong point. Further work is needed, however, to identify the career progression opportunities associated with jobs at various entry levels.

We now consider a more detailed treatment of specific problems of entry and career progression. The former are especially important for adolescents and youths; the latter often become crucial at mid-career. The analysis focuses largely on possibilities for amelioration through career education, but includes some interventions that are clearly outside its province in order to illustrate its limits. Further, in contrast to the preceding subsection on context, which discusses issues in system terms, this subsection is oriented toward problems of individuals. For example, while one general cause of entry-level problems may be that there are not enough jobs, it would be impossible to say that this was the reason behind the difficulties encountered by a specific individual. The hypothesis that there are not enough jobs should be explored to establish how many people and what population groups are affected, thus helping to identify targets. But target identification will still have to be followed by the kind of analysis of specific problems and possible ameliorative measures illustrated below.

Because the analysis becomes very complex, we present it in outline form. The appendix gives a detailed discussion and additional R&D suggestions.

Problems of Entry and Career Progression*

Entry into the Work Force.

Problem I. Lack of specific marketable occupational skills.

H1 Lack of exposure to training programs.

H1.1. Openings not available.

P1. Public provision of space.

P1.1. Public programs of skill training.

P1.2. Public schools to provide skill training (cf. Model I).

P1.3. Government contracts with trainers.

P2. Public encouragement of private provision of space.

P2.1. Training vouchers for participation in programs.

P2.2. Agents to place unemployed in programs.

P2.3. Subsidies or tax incentives for programs.

P3. Private encouragement of private provision of space.

P3.1. Cartelization of private programs to raise profits and incentives, through revision of Sherman Act.

P3.2. Trade regulation of private vocational schools to force them to lower prices.

H1.2. Openings available, but individuals not qualified.

P1. Remedial programs to meet qualifications. (cf. Model IV).

P2. New programs with less ambitious objectives and qualifications.

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*Key: Problem I. Suggested problem or barrier
H1. Hypothesized cause for problem
H1.1. Hypothesized subcause
P1. Suggested policy or program
P1.1. Alternative intervention.
Alternative interventions and programs are not listed when they follow directly from the suggested hypothesis.

P3. Changes in standards of qualifications for programs.

H1.3. Openings available, but individuals lack funds to participate.

P1. Subsidies to individuals.

P2. Programs provided at convenient times and places for employed persons.

P3. Simultaneous work-training programs.

H1.4. Openings available, but individuals not interested.

P1. Role-model programs.

P2. Special curriculum programs (cf. Model I).

P3. School guidance and counseling (cf. Model I).

P4. Incentives or sanctions.

P4.1. Cash prizes.

P4.2. Assurance of jobs after completion of training.

P4.3. Training requirements attached to welfare programs.

H1.5. Openings available, but individuals unaware of them.

P1. Programs to inform individuals of training opportunities (cf. Model III).

H2. Lack of skill acquisition within training programs.

H2.1. Lack of ability to learn.

P1. Better placement in training programs.

P2. Remedial programs to aid in skill acquisition.

P3. Changes in curricula to simplify skill acquisition.

H2.2. Lack of motivation to learn.

P1. Incentives.

P1.1. Cash payments.

P1.2. Guarantee of jobs.

P2. Improved career-motivation programs (cf. Model I).

H2.3. Ineffective instruction or poor curricula (cf. Models I and II).

P1. Individualized instruction.

P2. Curriculum reform.

P3. Changing instructional staff.

H2.4. External factors inhibiting learning.

P1. Research identifying the nature of these external factors.

H3. Acquisition of skills that are not marketable.

H3.1. Skills not wanted by labor market.

P1. Updated program content and instruction (cf. Model II).

P2. Programs to provide more generalized skills (cf. Model I).

H3.2. Job placement skills lacking (cf. Model IV).

Problem II. Lack of general skills.

H1. Dropped out of general education system.

H1.1. Individuals lacked funds to continue.

P1. Voucher programs.

P2. Correspondence courses and other general education alternatives.

H1.2. Individuals disenchanted with general education system.

P1. Career motivation programs (cf. Model I).

P2. Alternatives to the general education system (cf. Model II).

P3. Counseling and guidance programs.

H1.3. Individuals expelled from general education system.

P1. Role models and other career-motivation programs to encourage reentry.

P2. Alternatives to the general education system.

P3. Counseling and guidance programs.

P4. Sanctions.

H2. Remained in education system, but did not acquire marketable skills.

H2.1. Individuals lacking ability to learn.

P1. Remedial programs for acquisition of general skills.

P2. Individualized instruction.

P3. Improved placement policies.

H2.2. Individuals disenchanted with education system.

H2.3. Ineffective instruction or poor curricula.

Problem III. Lack of credentials for work entry

H1. Lack of skills to gain credentials.*

H2. Lack of alternative sources of credentials.

P1. New credential-granting programs.

P2. Programs to provide alternative means to meet credential requirements (cf. Model IV).

H3. Unrealistic credential requirements.

P1. Programs to modify or eliminate credential requirements.

P2. Improved entrance testing and placement procedures.

Problem IV. Personal constraints prohibiting work entry.

H1. Care of dependents.

P1. Public care of dependents.

P2. Vouchers for private care of dependents.

P3. Government or community cooperatives for care of dependents.

P4. Wage subsidies to supplement work at home and dependent care.

P5. Incentives for employers to provide work at home.

P6. Provision of dependent care at places of employment.

H2. Poor health or disability.

P1. Therapeutic programs.

P2. Job adjustments to compensate for physical handicaps.

P3. Incentives to employers for hiring the disabled.

Problem V. Breakdowns in the matching of people and job opportunities.

H1. Inadequate information regarding job opportunities.

H1.1. Poor information services.

P1. Government-provided information and guidance.

P2. Government support for private employment agencies and job agents.

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*If individuals cannot obtain credentials because they lack the skills to acquire them, then all those career education hypotheses listed above that are relevant to skill acquisition may pertain.

P3. Employer-financed information activities.

P4. Expansion of school (college) guidance and counseling.

H1.2. Lack of knowledge concerning information services.

P1. Government-sponsored job banks.

P2. Government-funded dissemination agents.

P3. Public or private dissemination systems (cf. Model III).

H1.3. Lack of funds to use information services.

P1. Financing tool-free call number to job banks or employment agencies (cf. Model III).

H2. Lack of geographic mobility.

H2.1. Financial limitations.

P1. Moving vouchers.

P2. Tax remissions based on moving to new job sites.

H2.2. Psychological limitations (personal ties or uncertainty regarding new locations).

P1. Programs to guarantee jobs in new areas (cf. Model IV).

P2. Agencies to provide housing assistance, etc.

H3. Limitations to occupational movement.

P1. Programs to provide information on alternative occupational opportunities.

P2. Programs of exposure and orientation to alternative occupations (cf. Model IV).

Problem VI. Conflicts between aspirations and reality.

H1. Lack of desirable opportunities.

P1. Programs to increase occupational alternatives.*

P2. Education of employers to eliminate undesirable characteristics of job.

P2.1. Improved work environments.

P2.2. Programs to eliminate discrimination, both in hiring and on the job.

P2.3. Improved advancement opportunities.

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*All skill acquisition programs mentioned earlier may apply here.

H2. Unrealistically high aspirations.

H2.1. Lack of exposure to world of work.

P1. Exposure to role models (cf. Model II)

P2. Work-study programs.

P3. Guidance and counseling.

P4. Education at work sites (Model II).

H2.2. Exposure to misinformation.

P1. Increasing the reality component of TV programs.

P2. Informational programs for parents.

H3. Unrealistically low expectations.

H3.1. Discouraging work experiences.

P1. School guidance and placement into work-study programs.

P2. School-controlled work-study programs.

P3. Improved matching services (cf. Model III).

H3.2. Exposure to misinformation.

P1. Community (block) counselors.

P2. Street academies.

P3. Role-model programs (cf. Model II).

Career Progression.

Problem I. Lack of opportunity for advancement.

P1. Programs to improve skills and attitudes for career advancement (cf. Model IV).

P2. Programs to encourage employers to redefine jobs to provide advancement possibilities.

P3. Improved job placement.

Problem II. Lack of skills for advancement.

H1. Lack of exposure to training required for advancement.*

H1.1. Lack of openings in training programs.*

H1.2. Lack of knowledge of training opportunities.*

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*Career education possibilities suggested in the discussion on entry problems may apply here.

H1.3. Lack of funds.*

H2. Exposure to training, but skills not learned.*

Problem III. Lack of credentials required for advancement.

P1. Programs to encourage employers to eliminate credential requirements for advancement.

P2. Redefinition of employment positions and establishment of paraprofessional positions that do not require credentials.

P3. Programs to provide information on acquisition of needed credentials (cf. Model III).

P4. Programs to encourage acquisition of credentials in alternative ways, e.g., government-accredited credentialing programs.

Problem IV. Lack of information or lack of mobility.*

Implications of the Conceptual Framework

The above framework can be used both substantively and strategically. First, and probably most important, it helps to *identify possible elements of an R&D agenda,* including both experimental impact programs and research on the validity of hypothesized underlying causes of career education problems.

Second, the repetitive nature of the framework, demonstrated by the abundance of recurring themes in hypothesized causes and suggested program or policy interventions, highlights several important points. In considering approaches for solving career education problems, it is often impossible to separate the goals of job entry and career advancement independent of defining the target population and the substance (as contrasted to the mechanism) of intervention. As the framework indicates, interventions based on information dissemination, work motivation, financial assistance, skill acquisition, and so forth are applicable to both problem areas. Hence, *programs mounted within the problem context of one portion of the framework may be adapted to provide advances within other contexts.* For example, programs to provide information dissemination services

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*Career education possibilities suggested in the discussion on entry problems may apply here.

concerning job opportunities may also be utilized to provide information on the availability of training programs, on alternatives to the general education system, on how to acquire needed credentials, and on the work characteristics of alternative occupational opportunities (cf. Model III). Similarly, hypotheses concerning the causes of career education problems (e.g., lack of funds, lack of information, and lack of opportunity) may be tested simultaneously within the various contexts in which they are found throughout the conceptual framework.

The third implication of the conceptual framework is that *certain hypotheses are critical to a number of related interventions and programs*, while other hypotheses are more intervention- or problem-specific. This may help direct attention toward research areas likely to have relatively high utility. Examples of these recurrent hypotheses are lack of sufficient funds, lack of proper attitudes or motivation, and presence of artificial structural barriers to job entry or advancement such as credentials unrelated to job characteristics. For instance, the framework indicates that lack of sufficient funds may be the reason for failure to participate in training programs for job entry or advancement, continue in the general education system, provide outside care for dependents, use job information services, or move to areas where there are job opportunities. For whom, if anybody, are these hypotheses concerning lack of sufficient funds true? And, more specifically, for which problem contexts are they appropriate? Research into these questions is of high priority because many intervention possibilities are tied specifically to the "lack of funds" hypothesis: These possibilities include subsidies for training program enrollment, work-training programs, correspondence courses, work-at-home programs, community cooperatives for dependent care, public job banks and information services, and extensions of tax relief for moving to new geographic areas to work.

As a converse to the above implication, we also find that *certain intervention modes are common to a number of hypotheses* concerning the nature of career education problems. Consequently, the framework directs attention toward the development of those intervention modes that may be applicable to more than one problem cause. For example, two recurring intervention themes are improved information dissemination

and improved guidance and counseling. The first pertains to informing individuals about training opportunities and educational alternatives, ways to acquire needed credentials for entry or advancement, and occupational opportunities. It also pertains to the development of public job banks, information dissemination agents, and public or private information systems. For all these potential programs, research and development on improvements in information handling and public access to information sources is necessary. Guidance and counseling as an intervention possibility is applied to stimulating interest in participation in training programs, preventing dropping out or being expelled from the general education system, preventing initial discouraging work experiences, and preventing unrealistic work expectations. In all these cases, research and development on counseling techniques, the identification of target users, and a better understanding of motivation and its influences would aid in program formulation.

The development of a conceptual analysis, while leading to many R&D recommendations, does not imply that we are advocating a strategy of investing only in research and policy questions identified independently from current career education activities and issues. Hence, in the next section we examine ongoing projects to establish their fit within the conceptual analysis and to derive R&D initiatives stemming from experimentation already in progress. Subsequently, we suggest a program plan integrating new and existing R&D activities and discuss the appropriate balance between them.

III. EXAMINATION OF THE MODELS

Since the initiation in 1971 of career education as a major Office of Education R&D program, the models (funded at $15 million in FY 1972) have constituted its substantive and financial core. Although other projects are being supported at this time, present commitments make it likely that the models will also constitute the core of the NIE Career Education Program in the immediate future, regardless of long-range program policy.

OVERVIEW

The Models Program was originally intended to have a dual purpose:

- To investigate and test several plausible alternative hypotheses regarding the delivery of career education, and
- To design and develop prototype career education programs congruent with each of the various hypotheses.

Although the program was launched as an R&D effort, much of the support allocated for it went to activities designed to institute reforms quickly. Therefore, efforts to date have concentrated almost exclusively on the development of education programs. Much of the discussion in this section is directed toward determining how a better balance between the two purposes might be attained.

The credibility of the Models Program rests on the following implied general assumptions:

- Unemployment and alienation represent acute problems that require deliberate social intervention to alleviate.
- A significant causal factor is the mismatch between skills and attitudes of adults and adolescents and the existing opportunities for leading a productive and satisfying life.

- The present educational system fails to provide appropriate skill and attitude training and linkages between trained individuals and existing employment opportunities.
- Career education innovations can play a major role in improving skills, attitudes, and matching.

The four models were conceived and designed as tests of alternative delivery systems for dealing specifically with this last assumption. Model I was to reform the established school system; Model II was to develop an employer-based educational alternative; Model III was to develop the technology of mass communication and the learning opportunities of the home; and Model IV* was to work with the whole family in a residential setting.

We next discuss the current set of projects. For each model we present a brief description, a general critique of the model projects, including the hypotheses, issues, insights, and problems that are raised, and a discussion of the model as a test of alternative educational delivery systems that have potential importance independent of the goals of career education.

A sobering observation regarding our critique of the Career Education models is that it is only the most recent of a rather lengthy series of analyses and issue papers on the topic. The substance of many of our findings is not qualitatively different from a number of these. Examples are the reports by Syracuse University Research Corporation** and Stanford Research Institute† and the views expressed in October 1971 by Harris†† a month after he became director of the

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*The genesis for Model IV was a preexisting physical facility (Glasgow Air Force Base) that was available for educational experimentation.

**_Comprehensive Career Education Models: Problems and Prospects_, Educational Policy Research Center, Syracuse University Research Corporation, June 1971.

†_Career Education--Prognosis for a Policy_, Educational Policy Research Center, Stanford Research Institute, December 1971.

††Rue W. Harris, "Plan for Career Education," _Proceedings of the Eighth Invitational Conference on Systems under Construction in Career Education and Development_, American Institutes for Research, Palo Alto, California, October 7-8, 1971.

Career Education Development Task Force in the Office of Education. Over the past year, many thoughtful observers of the Career Education Program have arrived at similar conclusions. Yet, until now little has changed in program direction. The Models Program seems to have been carried on largely uninfluenced by analysis of the problems and issues. An examination of the reasons for this disjunction between information available and actual operations, and the development of strategies to deal with it effectively, should become a top-priority task for the staff of the NIE Career Education Program.

MODEL I: SCHOOL-BASED

Description

Currently the Center for Vocational and Technical Education at the Ohio State University is the only Model I contractor. Associated with the Ohio State Center are six local school district sites that serve as demonstration centers for the project. The major problem focus of the Ohio State project is the alleged lack of preparedness of youths for employment, further study, and adult life. The project is an attempt to provide the curriculum of the established public school system with an explicit career orientation. The strategy is to "infuse" the entire K-12 curriculum with units that tie careers in some way to each subject being taught, emphasizing career awareness for grades K-6; career exploration for grades 7-9; and career preparation for grades 10-12. The method for infusion consists of developing career-focused curriculum materials, training teachers to incorporate these into their subjects, and expanding guidance activities. Underlying the current Model I activities are the specific assumptions that:

- A major aspect of the problem is the failure of the public school system to prepare adequately a large percentage of students for self-sufficiency and entry into adult life.
- The established public school system can be reformed to improve significantly this aspect of the problem.
- The critical area of the public school's need for reform is the curriculum.

The Ohio State project is essentially a test of whether the infusion model of curriculum change is an effective and viable strategy for the comprehensive reform deemed necessary.

General Critique

The Model I effort plays a critical role in the NIE Program portfolio and in career education in general. While the other models represent clearly alternative experiments, with few immediate or necessary consequences to the larger career education movement carried on by established educational authorities, Model I is expressly intended to change their practices. The model's K-12 curriculum of career awareness, exploration, and preparation currently permeates the rhetoric of the movement. The Model I project is consequently quite visible and has attached to it high educational and political expectations, despite the fact that the NIE Career Education Program can provide only a minor component of the funding for the total spectrum of career education activities.*

The principal difficulty of the Model I effort is developing and sustaining a balance among several priorities: (1) participation and leadership in the ongoing "national debate" over career education; (2) design and demonstration of exemplary school-based career education programs; and (3) undertaking of R&D initiatives to examine priority issues central to the model. Possibly the most critical factor that endangered the attempt to preserve this balance in the Ohio State project was the emergence, during the past year, of greatly expanded curriculum reform requirements. Originally this Model I project was envisioned to be a "capstone" effort that made use of the quality career education curricula assumed to exist in the field. Consequently, the curriculum development responsibilities of the project were limited to identifying

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*Much of the traditional and recently expanded vocational education resources now carry the career education rubric; state departments of education are being reorganized to highlight career education; and state and national funding policies are being rewritten to foster the career education theme.

existing materials, refining them as necessary, and packaging them for general dissemination. The anticipated materials were not located, however, and hence the curriculum efforts of the Model I project expanded to de novo development. Under the "capstone" assumption, a clear operational definition of career education for the project was perhaps not necessary or even advisable for it might, by implication, have restrained healthy diversity in the career education movement.

Now that the Model I project appears to require extensive original curriculum development, the necessity of working within an unambiguous operational definition becomes imperative. If the ambiguous definitional statements of the current project (e.g., career education goals range from specialized job skills to self-identity) are taken literally, the implied curriculum development task is of unprecedented and monumental dimensions. The requirements become more staggering when the effort, resources, and time constraints are compared with the far more limited and well-defined NSF-supported science curriculum projects. Under the present expanded conditions, the risk of the Model I project fragmenting and failing is quite high.

Several activities for improving the present Model I effort appear desirable:*

1. A careful review of the credibility of the assumptions underlying the "infusion strategy" of the project. At present, the strategy relies heavily on developing career education curriculum units and training teachers and counselors to incorporate these into their programs. Under circumstances where massive curriculum development is necessary, this may no longer be the most viable strategy for reform. Other strategies regarding structure and process might well be

*No distinction has been made here as to which of the suggested activities should be carried on as part of the Ohio State project and which ought to form the basis of new projects. Some of the testing of alternative strategies discussed under number 1 is appropriate to the current project, if the capability for such extensions exists. Most of the activities suggested under number 2 might best be developed through new projects.

investigated to support a more limited curriculum development thrust. For example:

a. Alter school staffing patterns to involve career role models directly in teaching.

b. Make career guidance activities more pervasive in the school and not just the responsibility of specialists.

c. Train staff in teaching styles that make personal decisionmaking and exploration a regular part of a student's experience.

d. Develop stronger linkages to career training opportunities outside of school.

2. A more systematic differentiation of the functional responsibilities of projects supported within the Model I framework:

a. Support conceptualization and technical assistance projects that

(1) Provide intellectual rigor, leadership, and insight to the national career education debate.

(2) Provide consultation and training assistance to career education programs at state and local levels.

(3) Serve as general clearinghouses for career education innovations.

b. Support exemplary career education programs as experimental sites for research and demonstration.

c. Support case-study descriptions, collection of information, and analyses of alternative examples of career education programs carried on in the formal educational system.

d. Support limited priority career education curriculum development efforts with specified aims (including adaptations of successful programs) as well as the development and testing of other well-defined intervention strategies.

e. Support the development of comprehensive methodologies for the evaluation of career education programs in schools and community colleges.

f. Support major longitudinal studies to evaluate the effect of career education, particularly as it relates to employment and work attitudes. These studies should also include analyses that assess the economic impact of traditional vocational as well as nonvocational education programs.

Despite the multiple roles that Model I must play in the career education movement and the extreme complexity of the reform task as it is presently defined, there is an important sense in which the model is being viewed from too limited a perspective. If the Model I effort is interpreted as an attempt to experiment with and demonstrate methods for improving the capacity of the present public school system to be relevant to the social needs underlying the career education movement, it appears to be a quite underutilized model. For example, relatively little attention has been paid thus far to improving and expanding the mechanisms for bringing the community into the school facility for educational purposes. Model I-related projects could be supported that systematically:

- Make it possible for adults from the community to participate regularly in the student's school life.
- Permit local businesses and industry to use school facilities in exchange for designing that use to serve educational ends.
- Set up school-based business (e.g., restaurant, beauty shop, print shop) in cooperation with local organizations.
- Take advantage of new school buildings at commercial sites.

At the same time, studies need to be undertaken on school bureaucratic barriers to the adoption of any positive findings or successful interventions that may result from Model I experiments.

Model I as a Test of an Educational Delivery System

Model I has been represented as a major, almost unique, experimental attempt to implement comprehensive K-12 reform in the public schools.

As such, it has acquired importance well beyond the immediate objectives of career education. This attempt at comprehensive school reform should itself be carefully considered as an NIE effort beyond the immediate aims of the Career Education Program as envisaged in this report. For such major reform, if it is to go beyond rhetoric, systematic design and analysis are required:

1. The present infusion strategy should be carefully documented, and natural variations across LEA sites noted and systematically compared; coordinated alternative treatments within the basic strategy should be designed and implemented among these local sites.
2. It is not at all clear that an infusion strategy of reform is the most effective, efficient, or generalizable way to bring about comprehensive curriculum change in the public schools. If possible, alternative strategies should be introduced into the Model I effort through new projects. These alternatives should be carefully documented, analyzed, and their costs and effects compared. For example, such alternative strategies might include:
   a. Training of school and district leadership to generate and develop career education programs indigenously at the local level.
   b. Development of "alternative" career education schools in local districts.
   c. Training of local community organizers to generate school change through public demand.
   d. Provision of financial incentives to local districts to undertake comprehensive school reform.
   e. Development of working linkages between school districts and nearby universities, employers, and R&D organizations to develop career education programs.
   f. Establishment of state legislative and/or executive policy to implement career education.

Several of these alternatives are already occurring naturally or are being funded through other public sources. The NIE should identify and take advantage of such situations and attempt to attach to them research and evaluation efforts so that some understanding is gained of the factors advancing or inhibiting change in education.

MODEL II: EMPLOYER-BASED

Description

At the present time there are four Model II contractors: The Far West Regional Educational Laboratory, the Northwest Regional Educational Laboratory, the Appalachia Educational Laboratory, and Research for Better Schools. As with Model I, the major problem focus of the projects funded under this model is the unpreparedness of youths for employment, further study, and adult life. The Model II projects are attempts to design an alternative to the public secondary school. Various work and other community environments are to be altered and extended to provide for nearly the full range of career education needs of adolescents. The specific assumptions underlying these Model II efforts are:

- The education provided by the public schools is irrelevant for a significant percentage of youths in that the secondary school system fails to prepare these and other students for self-sufficiency and adulthood.
- For many students the public school system is inherently incapable of solving the problem or even of contributing significantly to the solution. It appears that relevant learning for many adolescents must be experiential, in natural work environments. Moreover, negotiating mutually satisfactory matching between youths and employment opportunities is more complex today than merely training youths in appropriate occupational skills and attitudes; it requires mechanisms for directly linking students with the employer community during the training period.

- The immediate employer community is the most appropriate social mechanism through which to prepare many adolescents for their careers.

The model hypothesizes that there are natural incentives (or ones that can be effectively introduced through social policy) that will induce employers to provide comprehensive work-centered education for adolescents, and that such education will provide better life preparation than conventional schooling.

General Critique

The assumptions behind Model II would be considered rather extreme by educators. Therefore, one of the primary responsibilities of the R&D activities related to Model II should be to assess the validity of these underlying assumptions. For example, there already is considerable variety among the four Model II project sites regarding the purpose, governance, and use of a "learning center" apparently deemed necessary to complement the employer experience (the creation of a school outside school?). The nature of this variation should be made explicit and, if possible, systematic for several relevant dimensions including such variables as:

1. Relative amount of student time required in learning center activities.
2. The responsibilities of the learning center:
   a. Promoting peer group experiences.
   b. Extension, generalization of job learning.
   c. General, liberal arts education.
   d. Monitoring student progress and credentialing.
   e. Planning student programs of learning.
   f. Counseling.
   g. Scheduling and coordinating student activities.
   h. Administrative details.

3. Generic differences between the learning center activities and conventional or "enlightened" school activities.
4. Governance of the learning center.

One of the most difficult issues that must be addressed in the context of the Model II effort is that of coping with problems of scale. Several "Schools without Walls" projects have recently demonstrated that, on a small scale, community-based learning can be a viable alternative to the conventional school experience. It is not clear, however, that community-based efforts successful in heavily funded experimental programs (such as the Model II projects) are either appropriate or sufficient models for large-scale generalization, particularly when the experiments involve relatively small numbers of volunteer students and a few highly motivated employers. For example, it is quite likely that coordination and control of information regarding employer opportunities and constraints, related community resources, student goals and needs, student progress, and current and projected student learning experiences will quickly become a virtually unmanageable problem for the Model II projects if they expand much beyond a few hundred students and a few dozen cooperating employers. The development of sophisticated information management systems is a lengthy, complex task, particularly for a system that must accept data from diverse settings and must also be appropriate for educational planning and assessment purposes. This need and similar issues arising from considerations of scale should be anticipated and investigated both through analysis and experimental prototypes.

The potential generalizability of the model is also limited by the requirement that the immediate community of the learner be sufficiently rich and diverse in resources to provide comprehensive career education for the adolescent. This may be true in major urban and suburban centers, but it may not be the case elsewhere. The range of community resources and work environments required for a program that is both viable and comprehensive should be thoroughly investigated. For example, the projects might study options available (simulations, linkages to the resources of nearby metropolitan centers, cooperative exchange programs,

etc.) for adapting Model II to resource-poor areas.* In this regard, systematic comparisons among Model II projects of community resource needs and availability might be valuable. Also, the Model II projects coordinated by the Appalachia Educational Laboratory and the Northwest Regional Educational Laboratory might be encouraged to extend or shift their focus to more rural communities in their immediate region.

The early experience of the Model II projects and of related community-based attempts at reform indicates that lack of incentives for the employers to participate is a critical problem. It must be solved before there can be any reasonable hope of generalizing the model beyond a few atypical situations. Thus far, good will and favorable notice have been the predominant incentives. These are probably not sufficient if a sizable number of students is to be served. Conceivably, another motive could be a more productive work force for the employer, but in that case, employer-based education is likely to become education similar to the narrow skill-training prevalent in Germany and Russia for industry-bound adolescents. Further, unless employers are guaranteed the services of those they train (or unless trainees are sufficiently productive during training), firms will have little interest in improving the quality of the local labor pool. A concerted effort devoted to research and controlled experimentation should be supported to deal with the incentive problem. For example, research could be undertaken to:

1. Determine the incentives and disincentives that exist in work environments for providing preservice education and training. This analysis should investigate how educational activities of employers are affected by such variables as:
   a. Organizational size.
   b. Organizational differentiation (both vertical and horizontal).

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*The Rural Education Program of the Northwest Regional Educational Laboratory is intended to deal directly with the problem of community-based education in rural areas. This effort could feed into the Model II project being conducted by the laboratory.

c. Profit versus nonprofit organization.
d. Type of organization (production, service, research, etc.).
e. Degree of professionalization.
f. Management style.
g. Natural job-turnover rate.
h. Promotion policies of employer.
i. Present growth pattern of organization.
j. Local unemployment situation.
k. Degree to which skills taught by one firm are transferable to other firms.
l. Adequacy of area educational institutions in training for job skills needed by employer.
m. Tax structure and government constraints:
   (1) Profit ceilings (training as a way to hide profits).
   (2) Tax incentives.

Similar analyses of likely behavior of unions and of established educational institutions (both lower and higher) should be carried out, since these organizations may well perceive their interests to be threatened by a widely implemented employer-based educational system.

2. Study the distinguishing characteristics and incentives of organizations that appear to have installed their own strong educational components.
3. Support alternative employer incentive programs. For example, Model II project sites could be differentiated to compare:
   a. No explicit incentive; rely on "good will" and value of adolescent worker, or
   b. Educational vouchers given to each employer. These could be assessed by the NIE and results compared. Possible variations are:
      (1) Minimal "honorarium."
      (2) Cost reimbursement.
      (3) Profit-matching (profits for education match profits for production).

(4) Profit-extending.

c. Support of educational sabbatical program for regular employees in return for taking and training students.

If Model II is viewed as a potential alternative to the public high school rather than merely a test of an idea with no large-scale future impact intended, then careful study needs to be made of the possible social consequences. What kind of society do the dismantling of the public high school system and the transference of educational responsibility to the economic sector imply? For instance, there are powerful pressures inherent in the model that would lead employers to impart very specific job skills rather than general skills--to train students in skills relevant to the immediate and limited needs of the firm. Such pressures have direct consequences on the nature of education implied by the model and reveal underlying assumptions about the nature and needs of future adult life. Model II in its strict sense (divorced completely from the public school and concentrating on the employer rather than greater community environment) seems to anticipate a highly technical, relatively stable society rather than one of accelerating change that requires adult flexibility.

There is a tendency in Model II (present to a somewhat lesser degree in all the models projects) to assume that preparation for adult employment should emphasize technical skill preparation for entry-level positions, that is, for graduating students to be *trained* to enter jobs. M.I.T. economist Lester Thurow* has argued recently that employers choose new people not necessarily because they are trained for a specific job but rather because they are *trainable*. Once an employee is in the "labor queue" of the organization, then internal explicit and implicit training prepares him for his job and advancement within the firm. If Thurow's analysis is correct, the major responsibility of career education would seem to be to prepare people to be trainable for jobs and career advancement, rather than provide them with specific entry-level job

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*Lester C. Thurow, "Education and Economic Equality," *The Public Interest*, Summer 1972, p. 66.

skills. The learning experiences designed for one may not be appropriate for the other. An opposing theory, propounded by Ivar Berg,* holds that employers do not really know what the most desirable prerequisites are in terms of effective job performance and hence tend to demand artificially high and inappropriate credentials. There is some evidence that, at least in the military, this practice results in dissatisfield workers. The issues of training and requirements for entry-level skills need to be carefully investigated in order to understand better the linkages between formal education and work and to identify the learning experiences appropriate to the Model II framework.

The current Model II projects show little evidence of building on the cumulating record of experience with a wide variety of manpower training programs. Much of this record is discouraging; the factors making for failure to achieve original objectives or for the occasional successes need to be closely analyzed and findings incorporated into the Model II effort. Similarly, there are a number of employer-linked educational programs for adolescents carried on in other countries.** While cultural differences must be taken into consideration, these programs should be observed and understood both for possibly transferable practices and for unwanted side effects.

Model II as a Test of an Educational Delivery System

Model II attempts to utilize the natural environment of the community in a significant way for educational purposes. The reforms recommended by educational critics from a wide spectrum of philosophical persuasions (e.g., James Coleman, Ivan Illich) and an expanding number of "Schools without Walls" indicate that there is a significant emerging interest in community-based education.† Consequently, the educational significance

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*Ivar Berg, *Education and Jobs: The Great Training Robbery*, Praeger, New York, 1970.

**William W. Brickman, *Secondary and Post-Secondary Vocational Education in Selected European Countries Since 1960*, University of Pennsylvania, November 1971.

†James S. Coleman ("How Do the Young Become Adults?" *Review of Educational Research*, Vol. 42, No. 4, Fall 1972, pp. 431-439) and Ivan Illich (*De-schooling Society*, Harper and Row, New York, 1971).

of Model II may be broader than the immediate objectives of career education. In this regard, several initiatives are possible to complement and extend the present Model II effort:

1. Intensive case studies of representative communities to assess the range and depth of "educational" resources available to youth.
2. Development of sufficiently comprehensive systems to describe the educational resources of a community.
3. Development of community survey methodologies that facilitate the collection, organization, storage, and updating of community educational resource data.
4. Study of inhibiting statutes and of enabling legislation necessary to permit communities to extend their formal education system beyond the public school framework.
5. Historical investigations of significant attempts to extend formal learning into the community.
6. Investigations into the problem of monitoring, assessing, and credentialing experiential learning and design of mechanisms to accomplish these functions.
7. Regular program feedback of student experiences to improve training and tracking efforts. Added to observations of the Model II experiments should be studies of on-the-job training and proprietary school practices to discover educational methods that have met the market test.

MODEL III: HOME-BASED

Description

The Education Development Corporation (EDC) currently conducts the only Model III project. EDC is working in Providence, Rhode Island, to deal with the problem of unemployed adults and adolescents who lack

an institutional base in society. Unlike the other models projects, the EDC project is not attempting to teach skills and attitudes directly. Rather, the project is designed to apply mass communication media to the problems of assessing the career interests of selected home-based populations and of informing individuals about work and training opportunities already existing in the community. Several assumptions are implied by the EDC project:

- o A significant percentage of adults who are not students, employed, or actively seeking improved employment feel unsatisfied with their present situation and need career assistance.
- o Job opportunities and a variety of career training resources already exist for adults in the community.
- o Home-based or marginally employed individuals have specific career-related problems. Of these, the problems most amenable to change are insufficient guidance and information regarding the existence of these resources.
- o There is a lack of mechanisms to link effectively the career needs of home-based people with the existing educational and career opportunities of the community.

The project is testing the hypothesis that the mass communication media can be employed to fill the information and linkage gaps that prevent potentially productive people from entering (or reentering) the labor market.

General Critique

Originally Model III was conceived as providing a home-based delivery system for career training. Advances in communications and electronics technology that appeared to make home-centered formal learning feasible were to be coordinated into a comprehensive career education program. The information dissemination and linkage activities of the EDC Model III project appear worth pursuing as a first step, but the original

notion of actual delivery of education should not be lost. The home environment is being recognized increasingly as the most influential factor in a child's educational development, yet it is still a largely untapped resource for formal education. Specific program recommendations in this regard are made in the next subsection.

In contrast to some of the other models projects, the present EDC Model III project exhibits an impressive clarity of purpose. It appears to be an excellent example of combining research with a major operational development. In terms of long-range career education program policy, however, it is not clear that the problem addressed by this project is of sufficient national priority to warrant continuance of its current standing or degree of support. There are at least two reasons to question the project's emphasis. First, the argument that home-based adults who are involuntarily unemployed or underemployed are unable to obtain information regarding occupational training, employment opportunities, or career guidance has not yet been made convincingly. While information linkages between the home and various career-related resources in the community could no doubt stand improvement, this problem should be weighted against other career education needs. Second, it can be argued that the current Model III effort will aggravate problems of mismatch between aspirations and job availability at a time of chronic excess unemployment. This is particularly true if the target audience has a large percentage who through an aggressive information policy would decide to enter the job market not so much out of need but rather out of induced preference. The Career Education Program should carefully study the need versus the susceptibility for career-related information for various target populations. It is possible, for example, that an aggressive strategy may be appropriate for dropout adolescents, lonely depressed aged, or husbandless poor mothers, but only limited auxiliary services are called for to assist the young housewife or middle-aged. In this regard, it is important that individual and social benefit measures be developed to assess the value of alternative career information strategies in relation to their costs.

Model III as a Test of an Educational Delivery System

As already noted, Model III was originally intended in part as an attempt to develop and coordinate the learning potential of the home environment. This poorly understood and formally largely unused resource has long-term educational significance well beyond implications for career education. Model III provides the NIE with a major opportunity to investigate and probe the educational potential of the home. Possible initiatives suggested by this broader view of the model include support of:

1. Comprehensive experiments to tap the community service potential of cable television.
2. Efforts to research, develop, and test advanced TV technologies and innovations.
   a. Production innovations such as the Family Game (PBS) could be extended to a Life Careers Game.
   b. Initial work with interactive TV systems could be extended for educational purposes.
   c. Development and testing of career-oriented video cassettes could be supported.
   d. Development of the "Dual Audio Commercial TV." Notions to foster career awareness in young children could be encouraged through such experimentation.*
3. Efforts to develop educational use of home time-sharing computer systems.
   a. Development of the computer as a system for disseminating career development and in-service training information.**
   b. Revival of computer-based career guidance work funded between 1967 and 1969.†

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*T. Borton, "Dual Audio Television," *Harvard Educational Review*, Vol. XLI, February 1971, pp. 64-78.

**An extension of PLAN (Program of Learning in Accordance with Needs) in this direction with respect to in-service nurses training is now in progress at the American Institutes for Research.

†Wayne H. Holtzman (ed.), *Computer-Assisted Instruction, Testing, and Guidance*, Harper and Row, New York, 1970.

4. Efforts to integrate computing utility, problem-solving, and educational use of the computer in the home (leading possibly to a consumer subscriber system).
   a. Development of data banks on job, education, cultural, and community service needs.
   b. Development of Illich-style learning networks to informally match up interested learners with skilled practitioners, or to match up groups sharing common interests.

These suggestions are illustrative rather than comprehensive. Mass communications and electronic technologies are rapidly advancing fields with considerable educational implications, but adoption for specifically educational usage will not occur automatically. Each of the initiatives suggested above involves expensive multiyear design efforts, well beyond the available resources of the Career Education Program and of interest to the NIE as a whole. The role of the Career Education Program might be to: (1) support experiments that have potential for delivery of career education, and (2) use cooperative funding strategies to support research and educational development on new systems designs that might also be supported by other funding sources.

Any decision to extend the Model III effort to include work with advanced home-based instructional systems would also require research into possible problems arising from educational experiences that isolate the individual from his peers. These problems are probably particularly important for adolescents; special mechanisms may have to be developed to alleviate pressures in this direction. A related set of R&D questions has to do with building in learner motivation, so that instructional offerings attract and hold the intended audience. In addition, the program should support investigations to determine how to assess home-based learning and offer appropriate credentials.

The EDC Model III project can also be interpreted as a prototype of a socially important delivery system. Although we have argued that the project may not be very useful in terms of career education priority, it does have potential value beyond immediate priorities. Therefore,

the project could be continued as an attempt to develop and study a delivery system for coordinating social resource use and disseminating information--a need that embraces health, nutrition, housing, and basic government services in addition to education and employment. If the Career Education Program, or the NIE as a whole, were to consider the EDC project in this light, it might be possible to develop coordinated federal funding strategies for it.

MODEL IV: RESIDENTIAL

Description

This model is currently being developed and tested at the Glasgow Air Force Base through a project carried out by the Mountain-Plains Education and Economic Development Program, Inc. The principal problem focus of the Glasgow project is the chronically poor rural family. The project is a "total" intervention in that it attempts to influence all significant activities of the family, not only education-related activities. Since the major goal of the model is to make the family economically viable, special attention is paid to the adult members of the family, with heavy emphasis on skill training. The assumptions underlying the Glasgow project are that:

- Formal school intervention alone is not sufficiently powerful to assist chronically poor families.
- The problems of many poor families go beyond the lack of specific job skills for an adult member. They also include (1) lack of household management skills, (2) lack of health and nutrition knowledge, and (3) lack of child care skills. Extensive family counseling is also needed.

The project started with the hypothesis that poor families can best be helped by moving them away from their accustomed environment and into a controlled residential environment. Because of cost factors, however, nonresidential alternatives for other sites are now also being considered.

General Critique

One of the major difficulties with the Model IV Glasgow Air Force Base project is that it is inherently not cost-effective compared to nonresidential alternatives. Since we suspect that the Career Education Program is not free to terminate the project or redirect it drastically at this time, it can be usefully pursued only as a research project, not as a developmental prototype. Policy with respect to the other models must attempt to establish an appropriate balance between research and comprehensive prototype system development. The educational R&D interest of the Glasgow project, on the other hand, derives from the potential for research of a residential program. The obligation to provide quality services and training to the family residents must be met, but the operational program itself should not be confused with the R&D interests of the NIE. At present, however, the Glasgow project is virtually research-free, despite the formulation of numerous research objectives. Although the dominance of operations over systematic research and development is characteristic of all the models efforts, it is particularly acute in this project. If the Glasgow project is to become anything more than a liability to the NIE, it should be supplemented with a major R&D component.

The Glasgow project is a closed experiment, and thereby provides an ideal laboratory for addressing significant basic research questions such as the educational effects of interventions directed toward the family, the educational problems of transient and mobile families (e.g., the annual student turnover rate in many urban core schools is over 40 percent), and the interaction of social services in such areas as nutrition, health, sanitation, housing, and political participation with educational growth. These and other questions should be addressed and strategies developed for linking competent researchers to the Glasgow effort. Conceivably, part of the R&D effort might be to design and test changes that make the operation suitable for use at less idiosyncratic sites.

A second priority for Model IV is development of subprogram intervention strategies that can be employed in local communities and do not require residential dislocation. These intervention strategies should

be designed with explicit critical target families in mind such as:

1. Chronically poor families in urban core and rural areas.
2. Chronically transient and migrant families.
3. Recently dislocated families who do not have sufficient experience, skills, or social norms to prepare them for the new environment, for example, the southern mountain poor who are uprooted and settle in northern cities.

Model IV as a Test of an Educational Delivery System

The Model IV residential project does not appear to be developing an economically sound and generalizable delivery system. Consequently, its value as a test of an alternative to existing career education and job-training practices is questionable. It should, however, serve as a laboratory to test assumptions implicit in the Model IV formulation in order to guide any future policy regarding economic rehabilitation of families in residential settings.

COMMON ISSUES AND PROBLEMS

Even this brief review of the Models Program reveals that the projects are largely operational and not oriented to systematic research and development. This may be partly because the projects are in the initial stages, but to a large extent it is the result of past policy: deliberate emphasis on becoming operational as soon as possible and explicitly avoiding support of significant research components. Reshaping the program to achieve the NIE's R&D objectives will not be merely a matter of adding research efforts to each of the models but will require some quite fundamental alterations. For example, the time constraints on Model I and Model II projects in particular forced them to establish complex and costly organizational structures in order to prepare for implementation within one year. These structures are not likely to contribute materially to a more deliberate R&D effort and should probably be reorganized to reflect a more balanced set of priorities.

Except for the Glasgow Model IV project, all of the prime contractors for the Career Education models are part of the system of Regional

Laboratories and R&D Centers set up by the Office of Education. This system fails to offer much diversity in staffing and working style; hence, the projects are dominated by education professionals. Creativity and independent judgment are also impaired by the contractors' total dependency on the federal government for their funding. A much wider range of talent, R&D methodology, and performing institutions should be used to conduct career education projects.

The common rhetoric concerning the present Models Program emphasizes the notion that the four models are tests of alternative strategies for addressing essentially the same educational problem. Generally, this problem is presented as the failure of the public schools to prepare youths adequately for employability. To the extent that this view of the Models Program is valid, enough common variables should be preserved among projects to allow assessments of the relative efficacy of a school-oriented strategy compared with a work environment, media and mass communications, or total environment strategy. The current group of projects is characterized by happenstance variables and an absence of any systematic plan for comparative evaluation. An appropriate Career Education Program strategy would include:

1. Determining priority population groups and a set of career education objectives for which the models would be useful.
2. Phasing out those aspects of the present models projects that do not address the determined priority goals and/or populations; or adapting those aspects to conform with the priorities.
3. "Completing" the models by funding initiatives that fill gaps in the understanding of models or in the priorities.
4. Supporting comparative evaluation and research projects both within and among models.

Such a narrow focus on the alternative delivery system strategy is probably not entirely appropriate for the models effort. Nevertheless, the initial failure of the Models Program to provide a structured set of alternative delivery systems resulted in the loss of important

research opportunities. One primary analytical task is careful assessment of the areas in which the models can be adapted or extended to permit cross-model research. To the extent that the models projects do not really represent alternative delivery systems, the public and professional discussion should be redirected toward the actual aims of the projects.

The NIE Career Education Program must constantly recognize, not only theoretically and intellectually but also through program policy, that its resources represent only a modest investment in the career education movement, and only a miniscule one in respect to the broader issues of education or of the interaction of individuals with the economy. The unique function of the NIE Models Program is to provide the intellectual leadership and the R&D underpinnings to the larger career education movement, not to attempt to operationalize its reform rhetoric. Thus, the responsibility of the Career Education Program is to deal systematically with the fundamental questions, challenge the underlying assumptions, confront the structural constraints, and develop and test innovative designs--not merely to replicate or reflect the current fashions in education.

THE FIT BETWEEN THE MODELS AND THE CONCEPTUAL ANALYSIS

A difficulty with establishing exactly where the models projects fit into the conceptual analysis is that few of the projects have spelled out the assumptions guiding their operations sufficiently clearly to allow such an analysis.* Therefore, we have been forced to construct those assumptions from the available written material (proposals, reports, evaluations) and from observing operations. Both are probably unreliable guides, the first because proposals and reports are not particularly objective reflections of actual operations, and the second because the projects have not been under way long enough to draw

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*The EDC project is an exception. It states its assumptions explicitly, but these are all concerned with linking individuals to educational resources and pay little attention to the interactions between education and the labor market.

conclusions from their operations as to what they are trying to do.

It is clear, nevertheless, that the current portfolio, despite the all-inclusive rhetoric characteristic of career education efforts, deals with quite limited areas of the domain mapped by the conceptual analysis:

- In terms of the major objectives (reduction in unemployment, low-income employment, and alientation), the projects are mostly directed toward *unemployment*, though the hope is expressed in Models I and II that career decisions will also be improved; from this follows the implicit assumption that improved decisionmaking will result in employees who are not alienated. Only Model III is concerned with the low-income employed as part of the identified audience, though they are a minor component even within that project. None of the projects addresses the problems of mature workers in dead-end jobs.
- All the projects, with the exception of the Glasgow Air Force Base activity, concentrate on the *level* of unemployment rather than on distributional inequities since the projects either address all the population in the age group or allow self-selection, which is not likely to encourage those most subject to discrimination. Nor do project objectives, insofar as they are stated, consider the issue of equity in incidence of outcomes. The Model IV project does indeed aim at a disadvantaged population, the rural nomadic poor. It has not been established, however, that this is the top-priority group suffering from distributional inequities, particularly in view of its size.
- The projects focus almost exclusively on *entry* problems, though again the hope is implied that if an individual has requisite entry skills, he will also be able to advance.*

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*This view is in accordance with a theory of the labor market that posits job competition as its driving force rather than wage competition, as recently expounded by Thurow. (Thurow, loc. cit.)

- To cope with entry-level problems, the projects for Models II and IV are attempting to deliver specific occupational skills, and the Model I project expects to do so later. All three models also deal with general skills and attitudes. Moreover, they address the matching process with varying degrees of commitment, least in Model I, and most in the Model III project.
- Models I and II assume the chief cause of lack of skills to be the *failure of existing training programs* and expect to remedy this failure by creating alternative curricula or educational experiences. Models III and IV assume the problem to be *lack of exposure*--to guidance and counseling in the case of the Model III project, and to skill training in the case of the Model IV project. Neither of these projects specifically pinpoints past reasons for the lack of exposure; they simply attempt to institute curative mechanisms.

This brief discussion reveals that all the current projects fall within a fairly narrow range. This may be an acceptable and even preferred strategy for a program with limited resources, provided it has been deliberately designed to focus on priority problems. But neither the Model III nor the Model IV project appears to be addressing priority problems: Model III is not focusing on population groups with urgent needs; Model IV is not developing a replicable intervention design. Even when a limited focus is deliberately adopted, some of the program funds should support exploratory research along other lines where educational intervention appears to be an appropriate response to important problems. These exploratory efforts should have two purposes: developing additional information on what the priorities ought to be, and providing a base for future program directions.

IV. PROGRAM PLAN

The program plan outlined in this section is a synthesis of the specific suggestions derived from *the conceptual analysis* in Section II and *the examination of the models* (the critique of current projects) in Section III. The proposed plan emphasizes activities deemed particularly appropriate for FY 1974 and FY 1975. It contains four basic elements: (1) continuing analysis, (2) the models effort, (3) activities in addition to the models effort, and (4) evaluation. Our discussion of each element highlights specific activities and includes a summary of major R&D suggestions. We then note some criteria for assessment of the overall Career Education Program. The program budget is considered next, followed by some suggestions for setting budget priorities.

BASIC PROGRAM ELEMENTS

Research and Analysis

Both the elaboration of a conceptual framework (either the one used here or an alternative) and the inspection of current efforts (not only those supported by the NIE, but those going on under other federal or local sponsorship) must be continued. The *conceptual analysis* of the interaction of the labor market and education, if that is accepted as an appropriate framework for the NIE Career Education Program, must be supplemented by a state-of-knowledge review for each set of assumptions. In some cases where a great deal of information already exists, this may consist of nothing more than a sponsored critical analysis of data, literature, and research already on hand in order to come up with a set of findings that reflects accurately the current state of knowledge. One such area may be the degree to which the problems in the labor market are caused by its structure as distinguished from the level of aggregate demand. In other areas, for example, the reasons for poor motivation to absorb skills needed for entry into the work force,

research might be necessary to determine what part of the population is poorly motivated and why, and whether any successful intervention (developed through specific planning or through the intuition of skillful practitioners) is available for study.

The first step in our program plan is to examine the conceptual analysis more closely to determine what specific research projects are crucial to further development of the models effort, and what additional activities should receive high priority for funding through the Career Education Program. Thus, an immediate research task is the filling in, to the extent possible, of data and research findings bearing on the various analytical assumptions. Then, specific plans can be developed for studies in important areas now poorly understood that are likely to point to fruitful R&D directions in the future.

The second step is the continuing analysis of the models effort and of any other projects to be undertaken. This should illuminate in detail in what ways the models respond to the research, development, and design priorities identified in the conceptual analysis. Specific gaps will thereby become evident, to be addressed either in the context of the models or as extensions beyond the skill-delivery perspective. Extensions outside the conceptual analysis itself could also be considered as in the case of using Model II as a focus for community resources-centered education or Model III for a variety of home-based educational purposes. Decisions about undertaking such extensions should be based on judgments as to whether they are legitimate explorations of possible new program thrusts for the NIE, or simply low-priority activities that cannot be rationalized in the context of current funding levels.

In parallel with these two sets of analytical activities, there might well be a third step, additional conceptual analyses, addressing quite different problems. The purpose would be to gain an understanding of the feasibility of deriving an R&D program from a different problem definition than that of the labor market-education interaction, for example, the causes and possible means for alleviating youth alienation. If such a conceptual analysis uncovered feasible R&D ideas, those ideas could be evaluated for possible new program directions in the

future. It appears, however, that any serious effort to address the problems inherent in the labor market-education interaction discussed in this report will require considerable investments of talent and time, particularly considering the likely funding levels for the Career Education Program.

These three activities suggested under the analysis element should be carried out by the NIE staff, insofar as resources of time and number allow, by outside contractors working closely with the staff, or by a combination of both. Contracts could be prescriptive in terms of tasks to be performed, but might well leave the methodology to individual contractors or staff groups.

The Models Effort

Section II indicates where the existing models projects address R&D questions derived from the conceptual analysis; Section III makes some suggestions for extending the models effort to deal with issues within the scope of each model that have not yet been addressed, but are crucial to the success of ongoing projects. As one attempts to match the current projects to the R&D initiatives deduced from the conceptual analysis, a number of difficulties become apparent.

Lack of Coordinated Variables among Models. Incomparability and incoherence characterize the effort to date. For example, population groups addressed vary from adolescents to young mothers to the elderly to rural migrant families. The current work force is completely omitted, although it too faces significant problems that can be addressed through career education. Selection of participants varies from all individuals in a group (Model I) to self-selection (Model II) to hand-picked selection by the project (Model IV). The locus for delivery of career education, presumably the primary strategy of the models effort, is yet another variant. Treatment within each model seems to be generated on an ad hoc basis and therefore allows little comparison among models. (This is perhaps not altogether true of the Model I project, which in its rhetoric follows the original conception of delivering career awareness, career exploration, and career skills at elementary, junior high, and senior high levels; the project is also committed to a

particular--if questionable--intervention strategy of infusing the curriculum with units in these areas. Even if this treatment is actually followed in Model I, there is no parallel activity in the other three models that would allow a comparison of this treatment delivered in the other three loci.) In order to introduce the possibility of systematic comparison among models, variables will have to be restricted.

Specifically, we suggest *concentrating on adolescents* for a number of reasons. First, the NIE has a clear mandate for R&D in education. The adolescent in our society is generally considered to be at a point in his development where education should be a major focus of his life. This is indicated by the number of persons in relevant age groups involved in formally recognized educational activities, level of public investment in the education of adolescents, level of private investment and enrollment in institutions of higher education, compulsory school attendance laws, and increasing requirements for certification and degrees (secondary school and higher education) for job entry. Thus, education of adolescents is clearly within the NIE's province; the case for career training and counseling for adults--where other agencies have jurisdiction as well--is more tenuous. This is even more true for activities that are not generally considered to be education in its traditional sense (e.g., socialization of families to the norms of American family behavior).

A second reason for concentrating on adolescents is that the R&D tasks involved in improving career education for them seem large enough to command the full-time attention of the Career Education Program for the next several years. There is not only need and opportunity for educational experimentation, but also for study of the causes for the poor participation rates in the labor force by adolescents. It has been hypothesized that a primary reason may be lack of motivation caused by parent pressure toward high-status jobs, peer pressure against the work ethic, and general affluence resulting in diminished economic pressures on many young people without family responsibilities. Thus, a focus on adolescents could stimulate both an active research program and some imaginative developmental activities in secondary and higher education.

Third, the youth population may well contain the greatest number of individuals affected by career problems. The number of 16-to-19-year-olds in 1971 was 15 million; adding the 14- and 15-year-olds makes a total of 23 million. If 20-to-24-year-olds are also considered as making the transition between education and career, another 16 million would be added to the population group for a total of nearly 40 million (half the size of the current labor force) for whom the suggested focus would be relevant.

Fourth, investment in ameliorating the problems for these age groups will have more long-range benefits than for any other. The young have an entire lifetime of work ahead of them and have the maximum numbers of years to reap benefits from investments in their adequate education and socialization. Adolescents are also more likely to be responsive to educational efforts they see as relevant to their career aspirations and more demoralized by failure, compared to older individuals more likely to be socialized into their existing condition, even if it creates hardship and dissatisfaction for them.

Fifth, the current portfolio of the NIE Career Education Program is already weighted in the direction of the adolescent, although the focus is not explicit. Models I and II are really exclusively concerned with the adolescent, although Model I assumes that, for proper job training and socialization of the adolescent, intervention must begin early in a child's schooling. Hence, most of the money for Model I has thus far been spent in developing curriculum and training teachers at the elementary level, though without any exploration of the validity of this assumption. Model III includes the dropout adolescent (or marginally employed adolescent) as one of the three population groups to be addressed. Model IV has adolescents at the site as part of the family groups; it seems to take little advantage of this opportunity beyond exhortatory efforts to influence the local public school and holding a couple of meetings a week for teenagers. Extensions of Model III and IV to concentrate on adolescents would seem a feasible strategy; in particular, the effects of similar interventions in settings where adolescents are part of their own age group during the instruction process (Model I), are largely surrounded by adults (Model II), are on

their own (Model III), or are with their families (Model IV) should yield information on the beneficial or adverse consequences of each such grouping.

Lastly, public rhetoric and experience tend to connect adolescents and youth with some of the more serious difficulties in terms of interaction of any group with the economic sector. A career education program addressing the problems of adolescents, particularly when there are good reasons for such a focus, can help to gain acceptance for the NIE's R&D activities.

A major emphasis on a specific group does not preclude some activities for other population groups. However, these should be justified for one of several reasons:

- Treatment of the group is hypothesized to have direct impact on the adolescent, for example, attitude shaping relevant to job entry and advancement must begin before adolescence, or families as a whole must be treated in order to affect the adolescent.
- The marginal costs of affecting other population groups are so low that they may be included as exploratory activities for eventual new program thrusts. Examination of the current Model III project may lead to that conclusion, although it may turn out that the kind of matching services that have to be provided for adolescents are different from those provided for the other two groups addressed. If this is so, then the services required by the adolescent should receive first priority.
- Information on disabilities suffered by other groups and amenable to educational intervention is scarce but could be developed through low-cost research studies. Expensive development and experimentation would not be supported at this time, however.

Lack of Coherent Variation within Models. Although there is variation of many factors, it is uncoordinated. (The basic model strategy

of education delivery at different sites is the only planned variation.) The lack of deliberate variation within each model of intervention strategy, treatment strategy, or participant selection inhibits any conclusions about the effectiveness of particular design parameters. Suggestions for introducing better coordination of variations have already been made in the context of both the conceptual analysis and the inspection of the current projects. Examples are alternative intervention strategies for Model I, a greater range of types of employers for Model II, attempts to deliver education as well as a matching service in Model III, and a greater range of treatment opportunities for adolescents in Model IV.

Quite different types of variations could be built around alternative financing patterns for service delivery. In the context of Model II, for instance, alternatives are the current one of employers volunteering to deliver education without remuneration, vouchers given to students to pay employers for educational services delivered, tax breaks for employers furnishing education, fixed fees charged by employers and paid by local educational agencies on a per capita/per credit-hour basis, or fixed fees paid by a state or the federal government. (Additional variations were suggested in the preceding Model II discussion on employer incentives.) The actual choice of possible variations should be based on two considerations: (1) the likelihood that the set of variations will yield significant information concerning a crucial assumption or a set of design parameters for an educational innovation, and (2) the feasibility of instituting the set of variations--in terms of both resources and political acceptability.

The additional activities to be supported when concentrating on adolescents and introducing a greater range of coherent variations should consist of a mix of extensions of the current models projects and of new projects that are conceptually appropriate for each model. The need to conduct a much wider range of R&D activities in the context of the models effort leads to the third difficulty regarding that element of the program plan.

Absence of Replication Strategies. Except for the Model I project, the projects exhibit little concern with investigating the costs and

other critical factors on which information will be needed for installation once development is sufficiently advanced.* This may in part be due to the initial concentration on mounting large-scale activities within a very limited time period, but this deficiency must be remedied as soon as possible for each of the development/experimentation/demonstration projects if their applicability is to be tested. All models projects and any new projects to design an educational intervention should be prepared to produce, during the course of their lifetime, validated statements on the following:

- o Objectives of the intervention.
- o Nature of the intervention.
- o Assumptions guiding the intervention.
- o Specific changes in current practice or new elements.
- o Applicable population.
- o Evidence on effects of intervention.
- o Staff needed for implementation.
- o Training requirements for staff.
- o Auxiliary support needed.
- o Special requirements.
- o Operational costs (as distinguished from development costs).
- o Cost of replication (as opposed to operation of replicated project).
- o Cost-free resources used in the project that might have to be paid for at other sites.
- o Possible additional sources of funds if costs are beyond funds usually available.
- o Recommended steps and procedures for replication.
- o Time required for replication.
- o Necessary legislation or other changes in statutory requirements or sanctioned practices.

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*The Glasgow project has as one of its current responsibilities a cost comparison with other residential programs, but this does not consider the efficacy of alternative strategies.

- o Comparison along all these dimensions with alternatives having similar objectives.

The Model I project has identified four of the first five of these elements; as the critique of this project pointed out, however, the efficacy of the nature of the intervention and the specific changes to be made are in question because they are based on unvalidated assumptions.

Types of R&D Activity. As already discussed, the current models projects are operational attempts to bring about innovations that are prespecified but not developed or tested. Missing are several other components of the R&D spectrum:

- o Basic research to advance the state of knowledge about a particular subject,
- o Policy analysis to help in formulating priorities and making program decisions (in this case, about effective reshaping of education to improve delivery of skills and attitudes necessary for successful careers),
- o Observation--except for scattered instances--of naturally occurring experiments or interventions supported by others in order to accumulate knowledge about seemingly successful practices, and
- o Continued evaluation of the assumptions and operating strategies undergirding the current set of projects (as contrasted to individual project evaluation).

It is not likely that the current project directors could carry out all these tasks, even as they apply to their own projects. The kind of individual who can manage the logistics of accommodating 200 poor rural families at Glasgow Air Force Base amidst a number of other disparate activities is unlikely to be equally expert at designing research efforts that examine the validity of the educational strategies being employed. This kind of project furnishes a laboratory for generating and testing a variety of hypotheses about the socialization

of individuals to work and to each other in a family group, as well as to other social and economic agencies that have an impact on them. Thus, this project--and the other models according to suggestions in Section III--ought to be extended by a variety of projects conducted independently, selected on the basis of Career Education Program priorities, and performed by individuals who are qualified to conduct the particular style of research called for in each activity.

Activities in Addition to the Models Effort

Pursuing Directions Indicated by the Conceptual Analysis. The conceptual analysis of defined problems in career education, such as the one presented in this report or analogous ones that address different sets of problems, will reveal promising new initiatives to serve two purposes: (1) activities to strengthen the models effort, and (2) exploratory projects to shape future program directions.

Some possibilities, based on our analysis and concentrating on adolescents, include:

- An intensive examination of current training programs, both within formal school settings and at other locations such as on the job, to identify the reasons for the apparent success of such programs as those at the Dallas Skyline Center, Oklahoma Technical College, Malcolm X College, or the New York Fashion Institute.
- Efforts to introduce, with appropriate adaptation, similar programs into some of the models, particularly the school-based, the employer-based, and the residential operations. Supplying these models with instructional programs known to be effective would strengthen the efforts in terms of being able to investigate the effect of varied settings. It would also help avoid the dissipation of funds within each models project on the duplication of educational programs developed and tested elsewhere.
- Developing a better data base on the inefficiencies in the internal labor market in order to determine (1) how many

people are affected by advancement problems, (2) whether they fall into particular population groups, and (3) the extent to which the nation suffers from employee dissatisfaction when individuals are blocked from advancing to either more satisfying or greater income-producing careers.

- After development of the data base, a systematic investigation into the validity of the major hypotheses regarding job dissatisfaction that can be addressed through education.

These suggestions serve as examples only; selection of actual initiatives should be the subject of further analytical examination.

Serendipity Fund. A small amount of money, perhaps about 5 percent of program funds, should be set aside to support imaginative and relevant proposals that arise spontaneously from the field and do not necessarily fit into the preplanned program categories concerned with either the models effort or new thrusts. This fund should be administered together with other research funds, but no other program activities should be allowed to tap it. Such a fund would permit the inflow of ideas not previously captured by NIE attempts to define program priorities.

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For the reader's convenience, we present a summary of major program recommendations made in Sections II, III, and IV. These are organized by program elements discussed so far: analysis, models, and additional activities. The recommendations are of two kinds, those suggesting specific initiatives (e.g., analysis of current data-gathering activities) and those recommending general activities (e.g., diversifying funding). As a rule, the second type of recommendation applies across the program element under which it is listed.

Summary of Program Recommendations

I. Continuing Analysis.

A. Development of the conceptual structure.

1. Pursue "problem-discovery" activities.

2. Undertake state-of-the-knowledge reviews relevant to the conceptual framework:

a. Literature search and synthesis--where knowledge is firm but scattered, e.g., structural barriers to career entry and advancement.

b. Research-augmented studies--where knowledge is thin, e.g., career progression opportunities associated with various entry-level jobs, effects on performance of employee dissatisfaction.

3. Sponsor analysis of current data-gathering activities:

a. Systematic derivation of data relevant to career education concerns.

b. Identification of critical data gaps.

c. Filling these gaps.

B. Identification of priority targets for career education.

1. Identify individuals and groups for whom hypothesized causes of career entry and career advancement problems are relevant:

a. Number.

b. Characteristics.

c. Distribution.

2. Recognize through conceptual and empirical evidence which problem causes are more likely to hold for which population groups (examples only):

a. Lack of job-specific skills.

b. Lack of general skills.

c. Lack of appropriate attitudes for career entry or career progression.

d. Breakdown in matching people and job opportunities.

3. Examine possible responses as to probability of successful amelioration.

4. Determine set of career education objectives that seems most appropriate for population groups most affected.

C. Research into problems outside of strict economic domain.

1. Address conceptual issues such as the generation of operational definitions of problems and objectives.

2. Build the knowledge base required for programmatic R&D efforts in such areas as job dissatisfaction.

D. Investigation of alternative frameworks for the Career Education Program.

II. The Models Effort.

A. General Recommendations.

1. Alter current bias away from operational priorities to more of an R&D orientation.

2. Develop more comparability among models so that common problems and the relative efficacy of alternative strategies can be investigated:

a. Concentrate on adolescents.

b. Employ a greater degree of systematic variation, for example, in instructional strategies, delivering systems, or staffing.

3. Place greater emphasis on investigating factors that will facilitate the replication and installation of career education programs once development is sufficiently advanced.

4. Introduce with appropriate adaptation successful educational practices developed and tested elsewhere to avoid duplication of development and dissipation of funds.

5. Monitor ways in which the models respond to and deal with the research, development, and design priorities identified in the conceptual analysis.

6. Diversify funding to include a greater range of investigators and institutions.

B. Model I.

1. Review the assumptions underlying the "infusion strategy" of the model.
2. Investigate alternative school change strategies, e.g., staffing patterns.
3. Sponsor differentiation among projects in regard to providing leadership, providing consultation and assistance, serving as clearinghouse.
4. Improve mechanisms for bringing the community into the school to expand educational experiences.

C. Model II.

1. Make variation among Model II projects more explicit and comparable.
2. Increase the range of employer types.
3. Investigate problems of scale in employer-based alternatives to secondary schooling:
   a. Employer incentives.
   b. Information management.
   c. Structural and legal barriers.
4. Investigate problems of implementing Model II concepts in resource-poor areas, e.g., isolated rural communities.
5. Broaden research concerns from strictly employer-based programs to general problems of deschooling significant aspects of adolescent education.

D. Model III.

1. Investigate the need for career-related information among various population groups.
2. Investigate appropriate information delivery strategies for various target groups.
3. Concentrate on "high-priority" populations.
4. Investigate home-based strategies for delivery of education in addition to information on career and training opportunities.

5. Investigate delivery systems for coordinating information on a wider variety of community resources.

E. Model IV.

1. Add research component to present project.
2. Develop intervention strategies that can be employed in local communities and do not require residential dislocation.
3. Use project to investigate interaction of educational growth with nutrition, health, sanitation, housing, and political participation.

III. Additional Activities.

A. Assessment of career education programs not supported by the NIE:

1. Sponsor case studies of exemplary programs (Malcolm X College, New York Fashion Institute, Oklahoma Technical College, Dallas Skyline Center).
2. Provide consumer information on career education materials and practices.

B. Design of interventions for targets indentified in the analysis.

C. Support of efforts to test feasibility and efficacy of interventions.

D. Support of nonprogrammatic research relevant to career education.

Evaluation

Five distinct kinds of evaluation activities should be carried out as part of the program: (1) evaluation of individual projects within and outside the models, (2) evaluation of each set of model activities, (3) comparative evaluation among models, (4) evaluation of non-NIE interventions, and (5) evaluation of the overall program to determine at periodic intervals whether or not the collection of supported activities meets the objectives of the NIE Career Education Program.

General evaluative criteria for different types of R&D activities supported by the program are suggested in Section V, which deals with program implementation. In terms of the overall program plan, two points should be emphasized: the need to set aside a specific and sizable amount for evaluation activities to be carried out both by the staff itself and by sponsored researchers; and the need for the program to set some indicators relevant to its own operations. For the type of program suggested here--concentration on education as it affects an individual's functioning in the economy and concentration on a specific population group--what might such indicators be? An R&D agency such as the NIE should apply indicators that operate at the level at which R&D can have an impact:

- Additions to the knowledge base in terms of data, theory, and conceptual understanding.
- Development of information crucial to decisionmaking through analysis of existing data, gathering and analyzing observational and quantitative data on current activities and, where necessary, supporting social experiments in order to investigate specific policy questions.
- Success of educational innovations in terms of their efficacy and applicability.

The last level includes sufficient testing and replication to determine if the innovation can be implemented in different settings. Not included, however, are demonstrations whose principal objective is

to gain acceptance of a policy or an innovation, or large-scale implementation of either policy decisions or educational innovations.* If this distinction is clearly understood, then it becomes apparent that such indicators as the number of youths employed or the number of crimes committed by adolescents are not appropriate for NIE activities. There is a second reason why such large-scale social indicators are inappropriate, stemming from the fact that education--whether developing the knowledge base, making inputs to policy, or installing improved programs--is only one among several social institutions that affect such statistics. The conceptual analysis reveals that the specific assumptions about the appropriateness of educational intervention are only a few among a much wider network generated by hypotheses about the possible causes of the defined overall programs. Therefore, only those indicators directly focused on educational intervention are appropriate.

Even when NIE-initiated policies or educational innovations are eventually implemented on a large scale by other agencies, indicators of the numbers employed, crimes committed, salaries earned, and so forth must be used with care since they are composites from which the effectiveness of educational interventions cannot be analytically separated with confidence. Nevertheless, assumptions of success may be warranted when these and similar indicators have moved in a positive direction in cases where the educational intervention appears to be the major changed circumstance. Specific measures can also be used in a limited way in the assessment of an individual project where the stated aims make them appropriate, e.g., the number of participants placed in jobs within the current Model IV project or in an activity such as the Satellite Academies Program. The use of such indicators in a specific project should be accompanied by a research effort that examines the reasons for "success": how much is due to the educational intervention and how much to other attributes of the project, whether it is largely an example of the

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*An example of large-scale implementation of a policy decision might be the establishment of day care centers so that mothers can be trained to enter the labor market. Funding the 20 largest school systems to install a new teacher training program would be large-scale implementation of an educational innovation.

Hawthorne effect, or whether it is a result of idiosyncratic factors not replicable in other settings.

The precise nature of the indicators that are applicable at each of the three levels may have to be subject to further research and analysis for some program activities. There are, however, some guidelines available from appraisal of currently operating federal R&D support programs judged to be "successful":

Broadening the Knowledge Base. Indicators in this area are fairly well understood--peer judgment, frequency of citation of findings and other indicators of usage, and periodic state-of-the-art reviews (NIE-sponsored or independent) that reveal substantial advances in the course of a few years in the understanding of relevant topics.

Contribution to Policy Formulation. Again, usage criteria are appropriate, but the user clientele will be different. Instead of assessing the value of program activities to scholars in various disciplines and in education, indicators of usage should be applied to decisionmakers, for example, executive branches of government concerned with educational policy, congressional committees dealing with education, state and local education agencies, and schools of education. As one evaluation measure, the Career Education Program might at some time (possibly three years from now) analyze specific directions taken in career education at the federal and local levels in order to identify when and where NIE program activities have had substantial impact. Such analysis should also note instances of failure, for example, where directions were taken in deliberate contravention to what appeared to be NIE-developed information, or where such information was ignored because of gaps in communication.

Insofar as much of the research in both the knowledge base and policy areas will be directed at guiding development and experimentation, the results should also be evaluated in terms of the contribution made to understanding and shaping the Career Education Program's priorities and to improving the designs of the sponsored experiments and educational innovation.

Development and Testing of Educational Innovation. Educational innovation may consist of designing components that will help make an educational system work, for example, curriculum programs, an information system

accommodating the type of individualized program envisaged in Model II, some performance-based tests or other means by which to assess and give credit for education obtained in nontraditional ways; or it may put a number of components together so as to result in an innovative system. Each of these should be looked at separately; some components from an otherwise mediocre system may merit implementation on their own. Indicators of success for components of a system or for overall systems must be based on those operational objectives stated in the accepted proposals or those later modified by common agreement, e.g., in what ways the behavior of participants will be changed through taking part in the educational experience, or in what ways the developed component will improve the operations of a particular educational system as measured by suitable outcome criteria.

Another set of assessment criteria for development projects deals with the effectiveness of implementation strategies. For example, in the testing of an experimental program, were a sufficient number and the right kinds of variations built in to yield adequate information for subsequent installation in a variety of sites? This set of indicators should also assess usage. Appropriate questions are: Has the innovation formed the basis for large-scale implementation funding of social action agencies such as the Office of Education or the Department of Labor? Are local school systems or other educational institutions investing their own funds in adopting the innovation? Has the innovation brought about the intended change in a sufficient number of instances to warrant the original investment?

When any NIE-developed innovations are broadly adopted, evaluation efforts to assess the effectiveness of educational programs based on them should be carried out, again keeping in mind that indicators should be appropriate at the level where education makes its intervention rather than at levels where observable effects are likely to be the product of a number of other factors.

An important component of such evaluation efforts should be the assessment of unintended side effects, particularly if deleterious. Indeed, as already suggested, evaluation of any innovations in career education, whether or not developed by the NIE, should be an integral part of the program.

BUDGET COMPONENTS

Budget Proportions Allocated among Types of R&D

An important element of R&D strategy is the determination of the proportion of total R&D resources allocated to different types of R&D activity.

The R&D activities that the Career Education Program will have to support in order to have an impact on the knowledge base and on practice are:

1. Research*--activities undertaken to gain understanding or information, for example:
    - o Surveys to measure characteristics and identify needs of target populations.
    - o Detailed studies of current practice to point the way to promising improvements.
    - o Simulation models of manpower systems to identify and gain an understanding of the important factors.
    - o Experiments and inquiry to improve testing methodology.
    - o Cross-cultural studies to understand career education strategies in other countries.
2. Policy analysis--research undertaken to generate and compare alternative ways of making important program decisions, for example:

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*The research supported by the Career Education Program is likely to be qualitatively different from that of other federal R&D agencies in that a large share will address questions emerging from developmental and experimental activities. Research should be viewed as a means of servicing these activities as well as an investment in new ideas for career education. In Cronbach and Suppes' terms, research in career education should be as much decision-oriented as conclusion-oriented. (See L. Cronbach and P. Suppes, *Research for Tomorrow's Schools: Disciplined Inquiry for Education,* The MacMillan Company, London, 1969.)

- o Improving the conceptual framework for career education.
- o Advising the Career Education Program on priorities among objectives and redeployment of resources within objectives.
- o Identifying anomalies in current program efforts and results by cross-project comparisons, natural observation, and other means of inquiry.
- o Exposing conceptual fallacies in the design of career education projects.
- o Suggesting variations in career education projects that would increase their significance.

3. Development--invention of educational products for general use by practitioners or for use as components of large-scale experiments, for example:
   - o Curriculum units for teaching career awareness to elementary school students (Model I).
   - o Resource centers to link individuals to information about careers and to training opportunities (Model III).
4. Experimentation--large-scale intervention into a real-world setting to assemble and understand an improved, multicomponent educational innovation (Model II).
5. Evaluation--assessment of the effects of an educational product or large-scale intervention, for example:
   - o Impact evaluations to determine if a product or intervention is being applied as intended.
   - o Formative evaluations to discern the factors explaining why a product or intervention is (or is not) working.
   - o Summative evaluation to measure the net change caused by a product or intervention.

Implementation has purposely been omitted from this list of types of R&D activities in the opinion that the Career Education Program should not plan initially on spending its funds for implementation beyond testing and development of appropriate strategies. (These two activities should be part of every experimentation and development project.) One reason is that the budget level forecast for next year of $20 to $30 million is much smaller than the amount needed to support implementation on a nationwide scale. Another reason is that there are not enough proven career education innovations available to warrant an immediate commitment to broad-scale implementation. Some of the difficult issues of implementation will be considered in more detail in Section V.

Demonstration is another R&D activity that does not appear explicitly in the listing above. This term is used differently by different authorities. In one interpretation, "demonstration" describes a project where a proven educational product or intervention is displayed in a real-world setting as a means of attracting interest or disseminating information. Most evaluations of demonstrations as a vehicle of dissemination have concluded that demonstrations have some advocacy effect (practitioners become aware of demonstrated innovations) but very little transfer effect (practitioners do not adopt the innovation).* In another interpretation, "demonstration" describes a project undertaken to explore a new idea on a trial basis before making a sizable commitment to rigorous experimentation. This kind of demonstration is included in our "experimentation" category of types of R&D activities. A third interpretation of demonstration applies to projects where someone with an interesting idea is funded to set it up in a real-world environment to show others that it is workable. In this kind of demonstration, the idea is not rigorously developed and evaluated, nor viewed as a trial stage possibly leading to full-scale, disciplined experimentation. The Career Education

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*E. R. House, T. Kerins, and J. M. Steele, *The Demonstration Center: An Appraisal of the Illinois Experience*, Center for Instructional Research and Curriculum Evaluation, University of Illinois, December 1970.

Program should avoid this third kind of demonstration because very little practical effect is likely to be achieved, and should support the first kind of demonstration only for awareness purposes.

Given that the Program will include research, policy analysis, development, experimentation, and evaluation, what are appropriate budget allocations for each type of R&D? A number of factors must be considered in answering this question:

- There is no theory and very little empirical evidence that specifies exactly what the proportions among R&D types ought to be in the Career Education Program.* However, experience has shown that supporting only some of the types of R&D and not others, depending on what types are solely supported, leads either to an accumulation of understanding but few useful products, or to an accumulation of products but little understanding of how these products work or what attendant difficulties there are in replicating them.
- The proportions allocated to types of R&D activities should be strongly influenced by needs for particular projects as determined by policy analyses or by difficulties encountered in an ongoing project.
- The proportions allocated to types of R&D activities should be influenced by the technical quality of the work that can be supported. For example, there is no point in supporting research at a fixed percentage of the total budget if the quality of research proposed is low and cannot easily be improved.
- The Career Education staff will not be able to

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*The remark, sometimes heard, that development costs ten times as much as research, is more misleading than useful. On the average, a development project costs several times more than a research project, but on the other hand, usually many research projects need to be supported before principles emerge that are well enough understood to form the basis for a development project.

determine exactly what proportion of the R&D budget is actually spent on each of the types of R&D activity, because projects may not be categorizable precisely enough for exact sorting. Nevertheless, the staff should try to maintain an approximate fit between proportions originally allocated to each type of R&D activity and the proportions actually funded.

- A number of factors will affect the proportions: the orientation of the staff hired, the organizational form adopted,* the budget categories utilized, and the program objectives established.

In summary, R&D managers do not decide to support a certain percentage of each type of R&D activity and then implement their decision, since the actual proportion of the budget in an R&D program at any point in time is the consequence of a large number of indirectly related decisions. But because each type of R&D activity is required for the Program, these decisions should be made in light of the need to maintain an appropriate mix.

Previous career education budgets appear to have devoted about 80 to 90 percent to development and experimentation, and the remainder to the other categories. Since such an allocation leaves very little for research, policy analysis, and evaluation, we recommend the following shift: 10 percent for research, 5 percent for policy analysis, 20 percent for development, 40 percent for experimentation, and 25 percent for evaluation. The suggested percentages indicate approximate proportions; a variance of about one-fifth in either direction within each category would be quite appropriate. These figures are shown in Table 1.

Research is funded at a proportionately low level because of the intent to have much of it focused on supporting the developmental and

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*For example, dividing responsibilities within the Career Education Program by problem would, under most circumstances, tend to discourage support for research whereas dividing responsibility by type of R&D activity would not.

Table 1

BUDGET PROPORTIONS FOR FY 1974[a] BY TYPE OF R&D ACTIVITY

Type of R&D Activity	Proportion of Extramural Budget (%)
Research	10 ± 2
Policy Analysis[b]	5 ± 1
Development	20 ± 4
Experimentation	40 ± 8
Evaluation	25 ± 5
Total	100

[a]FY 1973 is considered a transitional year to be used to reshape the program so that by FY 1974 a more appropriate balance can be achieved. There might, in fact, be greater proportions than in subsequent years invested in research and policy analysis, particularly the latter, since FY 1973 should serve as the base for determining future program directions.

[b]Policy analysis should be conducted primarily by in-house Career Education staff.

experimental types of R&D activity. Policy analysis is budgeted for an even lower proportion, but this does not include the recommended internal policy analysis staff. Thus, in terms of total man-years of R&D effort, policy analysis would be allotted a higher proportion than 5 percent of the entire Career Education Program effort.

FY 1974 Budget Proportions for New Program Activities

The Career Education budget for FY 1974 can also be apportioned by categories that distinguish new starts from continuing projects. Four categories are: (1) existing projects within the four career education models, (2) new projects within the four models, (3) new thrusts (new thematic initiatives), and (4) the Serendipity Fund. Table 2 shows an apportionment of the FY 1974 Career Education Program budget based on the analysis in Section III of the existing Career Education models projects. That analysis leads to the conclusion that roughly 50 percent of the originally projected budget of $25 million for the existing

portfolio (counting some nonmodel commitments) should be continued with some modifications; therefore, approximately $12.5 million of the FY 1974 budget can be apportioned to this category. Of an anticipated FY 1974 budget of $25 million, 50 percent remains for new initiatives, both internal and external to the models. It should be pointed out that most of the types of R&D activities discussed earlier will be supported in each of the program categories in Table 2.

Table 2

BUDGET PROPORTIONS FOR NEW AND CONTINUING PROGRAM ACTIVITIES

Category	Proportion of FY 1974 Budget (%)	
Models	80	
Existing projects[a]		(50)
New projects		(30)
New thrusts	15	
Serendipity Fund	5	
Total	100	

[a]Some projects are extended; some are extended with modifications; all are reduced in budget.

These suggestions are applicable to the FY 1974 rather than the FY 1973 budget. We consider it very doubtful that a sufficient number of good new development and experimentation projects could be launched in the remaining six months of the current fiscal year. Even if priorities on R&D areas could be determined immediately, both in support of the models effort and outside it, developing appropriate guidelines, informing the field, allowing time for development of good proposals, and making funding decisions will--and should--be a longer process than six months would allow. At this point, the program might be better advised to err on the side of extending the deliberation process than of mounting yet another round of quick experimental projects. For this reason, while new efforts should be initiated as soon as feasible, FY 1973 activities should concentrate on further analysis, planning, and

program development--with FY 1974 as the year in which 50 percent of the program funds will go to NIE-initiated projects.

Budget Proportions in the Future

The proportions recommended for FY 1974 as to the types of R&D and new versus continuing activities are probably appropriate for FY 1975 as well, given similar budget levels. Beyond these next two years, however, budget proportions should be based on an appropriate balance between phasing out old activities and phasing in new ones. This balance should be determined by the process of theme* development, involving branching successes and failures (see Fig. 1). Emerging new themes should be identified through policy analysis and evaluation. Each theme chosen for the Program is likely to include a number of projects, varying in cost and duration according to the type of R&D entailed. In general, research projects and development projects can be expected to cost less and take a shorter time than experimentation projects because of the complexity of experimentation. Evaluation projects, depending on what is being evaluated, will have a wide range of durations from a short time period to a period as long as that required for an experimentation project.

Funding for new themes and for large projects within themes should follow the budget curve depicted in Fig. 2.** Expenditures should be small in the first year, while basic concepts are formulated and a number of approaches attempted on a trial basis. Expenditures can be expected to increase rapidly about two years after initiation to allow for some rigorous experimental and developmental activities. During this period, the decision should be made whether or not the basic theme is sound enough to warrant full-scale experimentation. Maximum R&D

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*An example of a theme is the use of job sites as a means of making education more relevant and effective.

**The Office of Education's program in career education is an example of a program that did not follow this expenditure pattern and paid the consequences in quality by initiating projects at peak expenditure levels.

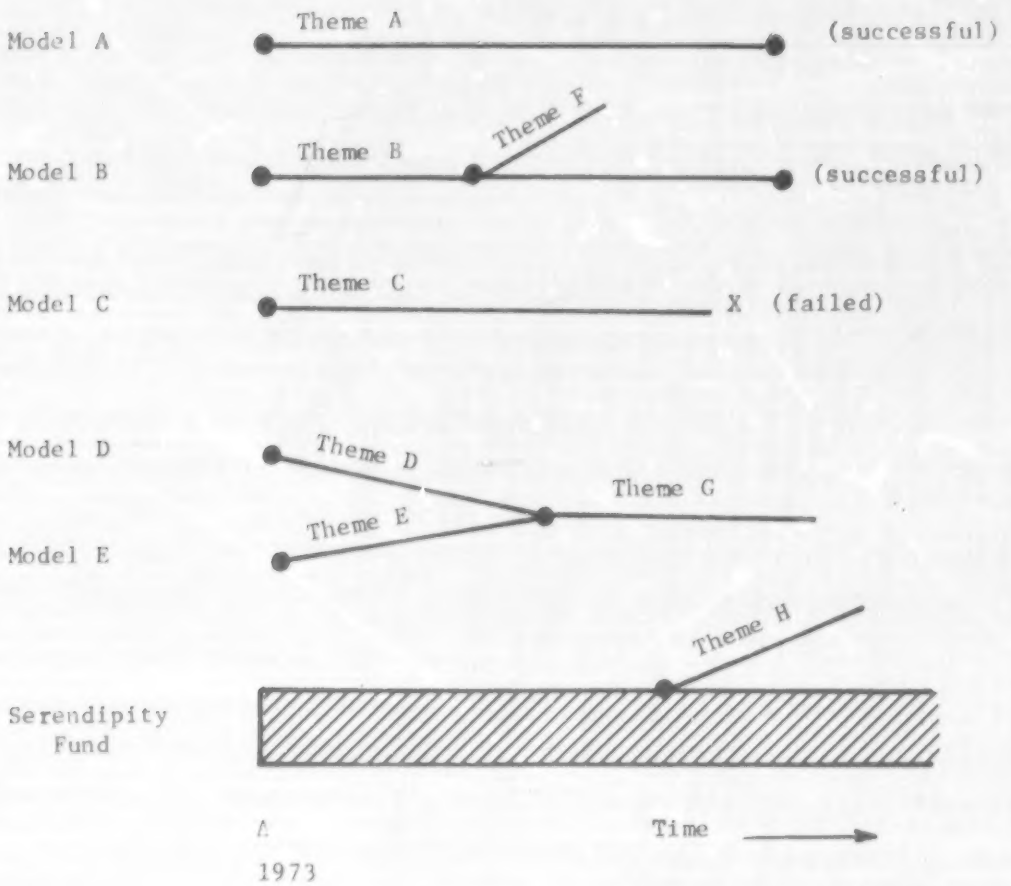

Fig. 1 -- Pictorial diagram of theme development process in R&D

expenditures per year should occur perhaps five years after the initial expenditure and then should begin to decrease. Expenditures for implementation should start at about this time, for at this stage the basic concepts formulated earlier must be translated into a proven, workable educational innovation. During and after the middle period of expenditure, small projects should be supported to test variations on the main theme. Some of these variations may turn out to be the initial stages of development of an entire new theme (branching). In the initial phase of theme elaboration, the research, policy analysis, and small-scale experimentation types of R&D should be a much higher proportion of the

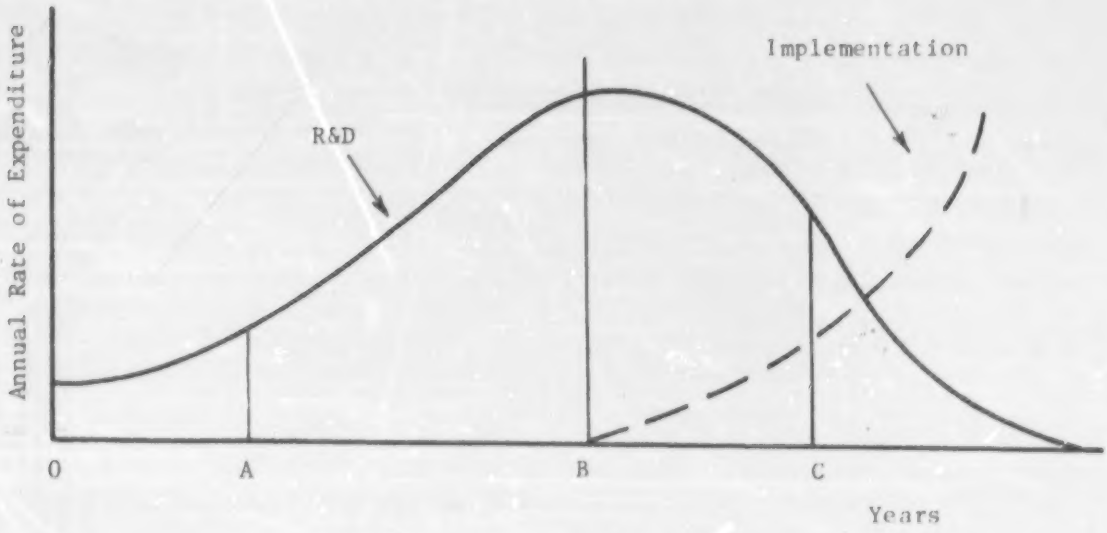

Fig. 2 -- Desirable distribution of expenditures over time for developing an R&D theme*

total expenditure than in the middle stage. In the middle stage, the development, large-scale experimentation, and evaluation types of R&D are likely to constitute a higher proportion.

Budget Priorities

The proposed program plan for the Career Education Program is based on the strategy of concentrating R&D resources on a few themes, while setting aside a portion of the total funds available as an investment in new ideas. This strategy has two immediate implications for planning. A capability will be needed for (1) formulating possible new themes, and (2) continually reassessing and establishing priorities among the alternative themes.

Theme generation and priority setting cannot be reduced to a mechanical process involving check-lists of criteria, elaborate taxonomies, and other devices. Nevertheless, existing constraints and

*See T. Marschak, T. K. Glennan, Jr., and R. Summers, *Strategy for R&D*, Springer-Verlag New York Inc., New York, 1967.

opportunities will structure the development and selection of themes. Examination of constraints and opportunities should include:

1. *Conceptual analysis* to differentiate target groups and decompose problems, carried on continuously both within the Career Education Program and extramurally. Some of the extramural work should take place at the major project sites in conjunction with experimental activities; some should be performed independently of other funding. A primary task for the NIE in-house policy-analysis staff is to tie the NIE activities to actual problems.
2. *Analysis of the state of the knowledge base* to determine the most fruitful avenues for career education programs. This kind of analysis should include reviews in selected areas of R&D results derived from NIE and other research programs. Sharing personnel with other NIE programs, hiring some extramural performers on tour-of-duty status, and assigning some research and analysis responsibility to every program staff member will help keep the staff up to date on relevant R&D findings.
3. *Analysis of the state of the action* to assess progress for each of the themes. Evaluation and observations by policy analysis staff should be augmented by assessment of experimentation proceeding independently of the NIE that could be useful to program objectives.
4. *Availability of funds* will limit the number of themes that can be separately pursued. In particular, planning will be needed to sequence the expenditure bulges of the middle period of theme elaboration, so that an orderly progression of theme development can take place.
5. *Availability of human resources* is probably the most crucial determinant in selecting priorities. Themes should not be given high priority, no matter how logically they flow from the analyses or how desirable the expected outcomes, if good people are not available or interested in working on the themes.

V. STRATEGIES FOR IMPLEMENTATION

SOME OPERATING POLICIES

As a way of introducing some specific recommendations about how the NIE Career Education Program's R&D might be organized and managed, we first discuss a few general policies that, in our judgment, are important to the Program's successful operation.

Broaden the Performer Community

The Career Education Program should strive to support a mixture of performers having a variety of institutional affiliations and professional skills. This policy is so important for the quality both of individual projects and of the overall R&D effort that it is further elaborated in the next several subsections.

Avoid Relying on Captive Institutions

The Career Education Program should rely very little on performers in institutions that are totally dependent on the NIE or the Office of Education for support. In the long run, such captive performers cannot be expected to assert independent judgment on priorities, quality, or objectives, and thus cannot supply the vital element of criticism that is essential in an R&D program.

Link to a Variety of Institutions

Conscious effort should be made to support performers in a variety of institutional settings as a means of tapping these institutions for knowledge and skills relevant to the Program and as independent sources of criticism. The pattern of affiliations should be chosen deliberately to include university faculty (some outside of schools of education), profit and nonprofit firms, practitioners from elementary or secondary school systems and community colleges, educational development laboratories, and education associations and commissions.

Provide Limited Institutional Support

Small amounts of general, nonproject-specific support could be awarded to selected organizations for the purpose of building a continuing capability for career education R&D. Preferably, these organizations should be carrying on R&D programs that also include activities outside the domain of career education. Funds equal to no more than 10 percent of all the career education projects performed by each selected organization in the previous two years might be awarded. Renewal of the award would not be automatic. The total amount for all sites should be fixed as an item in the overall Program budget, to be divided among organizations on the basis of biannual evaluations. Each year support for some organizations might be discontinued and some started. A four- or six-year limit on this kind of support could be established for each organization.

The purposes of such core support would be (1) to support policy analysis studies of career education, and (2) to develop quality staff in performer organizations, since the money could be used for acquiring new staff and carrying over staff from one project to another. The criteria for evaluation would be the quality of the policy analyses conducted, the quality and breadth of skills of the organization's staff, and the quality of the work produced by the staff supported on carry-over status.

Emphasize Continuity of Support

Performers on each career education project must be assured of funding continuity for their project over its lifetime, provided that the promised quality of effort is delivered and the interim objectives agreed upon are met, as assessed by periodic evaluation. Project terminations because of shifts in Program priorities should be avoided, for if the Program develops a reputation for such action, the quality of the performers willing to submit proposals for career education will drop precipitously. This is not to say, however, that all projects, once initiated, must be funded to the end regardless of quality or results.

In order to provide continuity, the Career Education Program will need to adopt certain operational principles. One, following the

expenditure curve in Fig. 2, is to initiate new themes on a small scale and build only as successes are found. Another is to support analysis (by internal staff and extramural performers) of national needs as they relate to career education. A third principle is to make the NIE's constituency aware of the time scale needed for solving important problems. The Career Education Program should set and announce two goals: Adding to the relevant knowledge base, and developing proven reforms for career education--with the warning that major successes in the latter area will require a long and diligent effort.

Develop Some Small Successes

One difficulty with such goals is that the public is impatient with R&D programs that do not rapidly achieve visible improvements. To counteract such attitudes, some resources might be allocated for developing a few readily exportable curriculum, staffing, or organizational innovations that do not require fundamental institutional changes. These development projects could be spun off from one of the models projects or funded independently. Some examples might be the matching services being developed by the Educational Development Center, some good curriculum units on career awareness and exploration that involve such new techniques as gaming and simulation, and some of the other model extensions already noted.

Integrate Training with Research

Although there will undoubtedly be shortages of certain kinds of R&D performers, establishing a separate unit within the Career Education Program to support R&D training projects is not recommended. If there are severe skill shortages that will apparently persist for many years, training might be undertaken as an adjunct to R&D projects involving these skills. In our judgment--based on a number of interviews with R&D managers in federal agencies--there are two positive results when training is conducted as part of an ongoing R&D project: The quality of the training experience will be higher, and more of the trainees are likely to continue in the field. R&D projects used as training media should be located at a university, R&D laboratory, or

other institution where trainees have ready access to a broad range of educational experiences.

Build a Reservoir of "Experts"

One last element of diversifying the performer community is to develop a reservoir of career education "experts" that can be called upon ad hoc as advisors and critics. Career education as envisaged here does not have a natural community of experts whose own involvement, depth of knowledge, and discrimination allow them to make judgments about the field or any specific effort in it. By contrast, R&D managers in the natural sciences and academic disciplines usually know to whom they can turn to obtain reliable advice. Building an equivalent reservoir of experts in career education may require supporting selected individuals on a continuous basis without close regard for their specific project interests.

Let Invention Lead Research

The linear model of the R&D process indicates, among other things, that development is based on research, and that the quality of development depends greatly on the breadth and depth of the relevant knowledge base. But in a field still largely based on empiricism, such as education, new practice and alternative systems are often invented intuitively, and such inventions can provide many hypotheses for research. The possibility that significant technical developments can be achieved without being preceded by research has, in fact, been noted in the science policy literature.* In education, the curriculum packages supported by the National Science Foundation in the 1950s and 1960s are examples of a technical achievement in which educational research shed little light either on what the major issues were in curriculum development or on how they could be resolved.

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*Uberholde, A.R.J.P., "The Beginning of Change from Craft Mystery to Science as a Basis for Technology," Charles Singer, et al. (eds.), *A History of Technology, Vol. IV, The Industrial Revolution c. 1750 to c. 1850*, Oxford University Press, 1958.

In career education, an application of the "let invention lead research" principle would be to fund practitioners who are apparently achieving extraordinary success in running an intervention closely related to the Career Education Program objectives.* The purpose would be to use the intervention setting as a natural laboratory for research and evaluation to formulate and test hypotheses about why the intervention was working. At the same time, replications at new sites would be attempted. The leadership responsible for the original success would be heavily involved in this expansion activity, helping to invent needed variations, train personnel, and so on. Expanding the scale of the invention will increase the number of variations extant for analysis and simultaneously expose some of the problems of implementation. In recent years, federal agencies have funded many innovative projects, especially in the social fields, but there has not been much practical success. One reason for this failure is that inventions have not been analyzed as to critical variables, so that a cumulative series of interventions with appropriate variations could be tested and successful ones adopted. Ultimately, the ideas underlying the invention may lead to important contributions to knowledge.

Substitute Managerial Policy for Implementation Activity

As discussed in Section IV, the Career Education Program should not assume responsibility for widespread implementation of its R&D results, since the resources required are far beyond what will be available in the next few years. Implementation will have to be the responsibility of the R&D utilization arm of the NIE, the Office of Education, or state and local agencies.

A disadvantage of this arrangement is that, in order to create practically useful R&D results, the Program will have to substitute managerial policies for the more natural incentives that could be provided if it had responsibility and resources for both R&D and implementation. In the absence of an implementation activity, there tends

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*Note that this is the opposite operational procedure from designing an intervention on paper and then finding a contractor willing to carry it out, as in the Models Program.

to be less feedback from practice concerning shortcomings of the R&D results that have been distributed, less feedback on what the important problems are in practice, more emphasis on research for understanding, and less attention given to the development of products useful in practice. Prototyping, project reporting, and implementation planning can to some degree substitute for the insights gained from direct practice.

Prototype. All innovations intended for use in practice should be replicated at least once in a setting simulating real-world conditions as closely as possible. The replication should be evaluated, unobtrusively when feasible, to determine whether the effect achieved in the research and experimentation environment can be achieved in a real-world environment at reasonable expenditures. Such a prototyping requirement would simulate in career education the product-testing phase of the R&D process used in many technological fields, even though the design of career education innovations cannot be "frozen" and then produced in quantity to the same extent.* The purpose is to encourage design teams to produce innovations that can be replicated easily in a variety of places without excessive redesign and adjustment costs. Project teams who know from the outset that their results will be subjected to testing will have a stronger incentive to produce practicable results than if no prototype tests are required.

But the differences between prototyping that involve physical technology and career education should be well understood. One major difference is that in the development of physical products (e.g., weapons, consumer goods) the same firm typically carries out both the design and the production phases. Since profits are potentially much greater in the production phase, the firm has strong incentives under the prototyping policy to produce designs that will pass the prototype test. If the prototypes do not pass the preestablished tests, the firm does not go

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*The Department of Defense has recently adopted the policy that several prototype copies of all new weapons systems be built on a semiproduction-line basis and tested to determine that original performance and cost specifications are met before large-quantity production contracts are approved. Dod's objective in prototyping is to reduce the need for weapons systems to be redesigned and retrofitted during production in order to overcome deficiencies due to incomplete product development.

into production. In career education, it is not as likely that design and implementation will be done by the same organization. A second difference is that there may be no profit motive if "firms" are public agencies or nonprofit institutions. As a consequence, the incentive effect of prototyping may not be very strong in career education, but the process should still be useful in uncovering implementation difficulties.

Project Reports. Every career education project report, no matter what type of R&D it is, should be required to state: (1) the resources used to carry it out, (2) the implications of the results achieved for practice and for R&D, and (3) the steps required to implement those results. Where appropriate, the additional requirement should be made that the project be responsible for carrying out the implementation steps. All projects should be notified of these requirements before proposals are submitted, after projects are awarded, and at least once midway during project performance.

Implementation Planning. Where the objective is an innovation useful in practice, the planning of a diffusion strategy should be required in the early stages of development, before many design parameters are fixed. The diffusion strategy may have to be redesigned at the end of the project; however, as research on R&D utilization has indicated,* planning for implementation should receive a substantial share of project resources early in a project's lifetime. Of the implementation policies that have been suggested, this policy is, by far, the most firmly supported by research results.

PROJECT GENERATION

One important part of the R&D management process is the generation of project ideas. The problem is how to develop projects that are

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*J. J. Crawford, et al., *Evaluation of the Impact of Educational Research and Development Products*, American Institutes for Research, 1972; E. M. Glaser and S. H. Taylor, *Factors Influencing the Success of Applied Research: A Study of Ten NIMH-Funded Projects*, Human Interaction Research Institute, January 1969; E. M. Glaser and H. L. Ross, *Increasing the Utilization of Applied Research Results*, Human Interaction Research Institute, March 1971.

innovative but that also address the Career Education Program's priorities. These two needs are somewhat in conflict, because concentrating R&D resources is likely to result in the rejection of some good ideas that do not serve current priorities. The exceptions will be those projects supported by the Serendipity Fund.

Sources of Ideas

One source of project ideas will be the Career Education staff, especially the policy analysis group that has been recommended. *Concentrating R&D activities on priority problems can be achieved by having internal staff generate the outlines of project ideas.* Clearly, the quality of these ideas will be dependent on the knowledge and subject matter expertise of the internal staff--skills in project administration will not be a satisfactory substitute.

The other primary source of project ideas will be the extramural performer community. The flow of innovative ideas can be maximized by enlisting performers from a wide range of institutional settings--one of the reasons for our earlier policy suggestions on diversification. Some of these institutional settings are:

- o Business and industry.
- o Social service organizations.
- o Universities.
- o Nonprofit institutions.

If most career education performers come from only one of these institutional settings, the project generation process will be without the differing viewpoints and skills of those in the other institutional settings.

Staff/Field Interaction

Personal interaction between the external community and the Career Education Program staff should be a principal means of building quality and disseminating information on career education priorities. The staff must be able to find potential R&D performers of high quality and

convince them of the challenge and importance of working on career education problems. This requires especially skilled program managers and other staff. It will not be enough to announce project interests with a Request for Proposals (RFP) and then wait to see who submits proposals, or to tap the current circle of contractors. Most potentially good performers will already be busy and will not apply; continually dealing with the same performers will deprive the Program of innovative ideas.

Two devices for building interest in the performer community that are used in other R&D programs are:

- o Frequent use of ad hoc panels for planning, evaluation, and idea generation purposes.
- o Visits to action sites by groups of program staff and potential performers.

The National Institute of Child Health and Human Development (NICHHD), for example, convenes a large number of ad hoc panels each year* to advise program managers on priorities, conduct state-of-the-art reviews, organize workshops to discuss important issues, evaluate programs and R&D centers, and so on. Over time, the Institute has carefully worked out an optimal structure for each type of panel, so that its purposes can be met with least wasted energy. The panel system has been of major importance in recruiting R&D talent; the Institute estimates that over one-half of their current R&D performers first heard of NICHHD programs by participating in a panel or workshop.

RFP Provisions

Most career education projects should be supported by contract. (Exceptions are basic research projects and projects supported under the Serendipity Fund.) Different styles of contracts should be used,

*Twenty panels were convened for the program in FY 1972 when it operated on a budget of $66 million. In some types of panels, graduate students attend as observers or, sometimes, as participants.

depending on the degree of control desired over the content of the project. For each style of contract, there should be a congruent form of RFP.

. At least three styles can be distinguished:

- o Highly prescriptive--suitable for tasks where great control over project content and methodology is needed (for example, survey research or certain kinds of evaluation).
- o Moderately prescriptive--suitable for projects where a specific product is needed but control is not needed over methodology (for example, a project to improve understanding about the importance of peer groups to adolescent learning).
- o Permissive--suitable for unsolicited projects.

Precise styles need not be established a priori; appropriate program administration will accommodate a range of styles that are tailored to fit particular conditions. Guidelines for writing RFPs might be developed that allow the Program to fund a contract only if proposals are of sufficiently high quality. Establishing this feature, for example, by specifying that bidders meet minimum standards of experience and accomplishment, would set an important precedent concerning the caliber of work expected.

One important reason for including minimum-quality provisions in RFPs is to reduce the number of bids received and thus lighten the proposal review workload. Program managers and their outside advisers should have more interesting and productive responsibilities than spending time reading poor and mediocre proposals. This has been a serious problem in some R&D agencies using the RFP mechanism. Brief draft proposals as a first response to RFPs, on the basis of which the most attractive could be developed in detail, can also serve as a management mechanism both to attract good performers and to cut down on staff workload.

Another consideration in writing RFPs is the amount of staff time

required, which should vary with the style of the RFP. Highly prescriptive RFPs require much more staff time to write than the less prescriptive styles. For example, the Office of Economic Opportunity typically has assigned one or two analysts (a subject matter expert and a specialist in evaluation design) full-time for six months to write an RFP for evaluation contracts of $100,000 or more. The more highly specified an RFP, the more rigorous and structured must be the review process it undergoes before release. When RFPs are used to solicit projects that have many predetermined parameters and are largely designed by the staff rather than by the proposers (e.g., as in some evaluation tasks), approval of an RFP for release to bidders is the key program-content decision, not proposal selection as in procurement by grant. For this kind of contracting, proposal selection is primarily a quality-control decision--to select the best performer for a specified task.

PROPOSAL EVALUATION

Two aspects of proposal evaluation will be considered: (1) the procedures used for proposal selection, and (2) the criteria appropriate for different types of R&D projects.

Unless procedures for selecting proposals are impartial and mirror widely understood quality standards, extramural performers will not respect the judgments of the Career Education staff, particularly if the evaluation process is ad hoc and hidden from public view. If qualified investigators and developers do not respect the staff's judgments, it will be very difficult to induce them to submit proposals. This is not to say that there is only one appropriate set of procedures; different evaluation mechanisms may be needed for each type of grant or contract awarded.

Selection Procedures

Four different modes for proposal selection, useful for both grants and contracts, are relevent to the Career Education Program. The key person in each of these is the project manager,* who has responsibility

*Other titles sometimes used are project officer, program director, and program officer.

for managing a number of extramural R&D projects in an assigned problem area. The project manager may serve either full-time or part-time with the remainder of his time spent on research, policy analysis, or project design. The degree of autonomy in decisionmaking available to this staff members is an important factor in establishing the caliber of staff likely to be recruited to the Program.

Project Manager with Mail Review. In this process, the project manager selects the proposals to fund and decides on budget levels, using advice solicited by mail from experts in the extramural community. The project manager selects a different set of experts for different proposals. He may elicit, by careful wording of his request letter, comments on particularly troublesome points. After the experts submit their written evaluations, the project manager assesses them in light of his program objectives and then decides which proposals to fund. With the mail-review procedure, project managers need to maintain a long list of potential reviewers so that the subject-matter expertise of the reviewer can be matched to the subject of the proposal, and so that no reviewer receives more than a few proposals each year.

Project Manager with an Expert Panel. A second mode is for the project manager to decide upon proposals and budget levels jointly in session with a panel of experts. A variant of this procedure allows for subsequent reevaluation by program staff and some adjustment of decisions. The panel can be convened ad hoc for specific proposals (particularly when they are for large projects) or convened ad hoc for a number of proposals, or the panel can be established permanently. In the last case, panelists are replaced periodically after serving for a finite period of time. This method often generates particularly useful suggestions for revision of interesting but not fully acceptable proposals.

Project Manager with an Internal Panel. The third mode is a variant of the second, the only difference being that the panel is composed of internal staff. This method is often used when a project fills a very specific program requirement or when time constraints are severe.

Panel of Experts. A fourth proposal selection mode, often used in fields with well-established internal communities, is to have a

panel of experts decide which proposals to fund. To establish accountability, panelists should serve on a continuing rather than an ad hoc basis. This method tends to give the program manager minimal autonomy.

Selection Criteria

No matter what procedures are used for proposal selection, criteria for judging merit should be defined. The following might be considered:

1. Quality criteria.
   a. Are project objectives stated clearly and unambiguously?
   b. Are the project objectives reasonable? Is the project feasible?
   c. Is the budget appropriate to the work to be done?
   d. Is the proposed project innovative? Imaginative?
   e. Is the proposed methodology sound?*
   f. Do project plans indicate awareness of concepts and data bases that already exist and are relevant?*
   g. Will implementation strategies be thoroughly considered? Early in the project lifetime?**
   h. Is cost-consciousness exhibited--for the project itself? For later implementation?**
   i. What is the quality of the principal investigators and other project staff?
   j. What is the previous record of performance of the project team? On career education projects?
   K. For continuation proposals: Is the project achieving as anticipated? If not, are there acceptable reasons?

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*Particularly important for research and policy analysis projects.

**Particularly important for development and experimental projects.

2. Relevance criteria.
   a. Are the project objectives relevant to career education priorities? To the NIE Career Education Program priorities?
   b. Are results likely to be useful to policy or practice in career education?
   c. Can the project results be generalized for widespread application other than in the immediately proposed context?*
   d. Would the project be likely to continue at its original site after withdrawal of federal funds?*
   e. Is the project so unusual in its leadership, location, or subject that replication is unlikely?*

PROJECT MONITORING

A third part of the R&D management process is monitoring the progress on projects that have been funded. Project monitoring can include a number of different activities:

- o Evaluating progress with respect to project milestones and quality of performance.
- o Organizing or providing technical assistance and other resources to improve project performance.
- o Adjusting project objectives and operations to meet changing external conditions.
- o Coordinating interrelated projects, such as an experiment and an evaluation.
- o Establishing communications and collaboration among similar projects.

In order to carry out their monitoring functions effectively, project managers must be provided with adequate contract (or grant) management support, so that they can concentrate on substantive matters.

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*Particularly important for development and experimental projects.

Some agencies arrange that contract management staff handle all budget, accounting, and auditing requirements and inquiries, and all physical and travel arrangements for site visits and conferences. In order for such a system of divided responsibilities to work, however, the program manager must have clear authority over the support staff, otherwise accountability is lost. (An example of a dual system carried too far was in the management of some former Office of Education programs where the program officer had no control or even knowledge of major contract provisions for a project nominally in his program.)

Just as with specificity of RFPs, different degrees of monitoring should be applied to different types of R&D projects. The degree of control over the content of a project desired must be matched by the managerial effort devoted to monitoring it. For example, on evaluation projects where usually a great deal of control is needed, the Office of Economic Opportunity used one project manager full-time for each contract of $100,000 or more. Large evaluation contracts of $1 million or more will typically require two full-time project managers. On the other hand, most research projects require little monitoring, unless a specific product is needed.

ORGANIZATIONAL ALTERNATIVES

The Career Education Program is large enough that a decision will have to be made on how to divide it into subunits of organization.

Two alternatives seem most attractive: diving by *R&D themes* or dividing by *type of R&D*.

The major divisions within the Career Education Program for the first alternative could coincide with the major themes being pursued (e.g., the four models). In addition, one other division would be needed: "new programs." For the second alternative, the divisions could coincide with an arrangement of the types of R&D supported. One possible arrangement is policy analysis, evaluation, research and development, and career education systems. The career education systems division would manage the major experimental sites supported. Work on each of the themes would be done in all of the divisions.

Alternative 1: Dividing by R&D Themes

Some advantages and disadvantages of organizing the Career Education Program by R&D themes are as follows:

Advantages

- Coordination of the several types of R&D within each theme would be facilitated by having all types of R&D supported by each organizational unit.
- The Career Education Program's priorities would be more visible to the external community if they were identified with a particular organizational unit.

Disadvantages

- Organizational barriers would be created that probably would inhibit the theme elaboration process depicted in Fig. 1. Old themes would be difficult to drop and new ones difficult to start.
- The budget policy depicted in Fig. 2, particularly the phasing in and out of major projects, would be difficult to implement because different themes would be at different stages of development at any one time. This would cause year-to-year changes in the budget for each theme (and hence, organizational unit), introducing variations difficult to control in terms of overall budget balance.
- In the course of theme development, the staff of each organizational unit would have to change from an orientation that is predominantly research and policy analysis to one that emphasizes development and experimentation, entailing the adoption of quite different managerial styles.
- Development of specialized skills (for example, in evaluation design or policy analysis) would be inhibited by the homogeneity effects of maintaining a full cross-section of all skills in each organizational unit.

Alternative 2: Dividing by Type of R&D

Organizing by type of R&D produces a converse set of advantages and disadvantages:

Advantages

- o Organizational barriers to shifting resources among themes would be minimized.
- o Management of desired project phasing and budget proportions would be more feasible.
- o Skill specialization would be enhanced.

Disadvantages

- o Coordination of different types of R&D activity within individual themes would be more difficult since projects relating to a theme would be located in several different units of organization.
- o The Career Education Program's priorities would not be visible in the organizational structure.

Since there is not much empirical evidence in favor of any particular choice, decisions on organizational arrangements become a matter of judgment. Because we value organizational flexibility more than visibility of priorities, we prefer dividing by type of R&D to dividing by themes. Coordination can be achieved through auxiliary organizational means, for example, through a matrix organization (Fig. 3).* There could be permanent organizational units, and one temporary organizational unit, each with an appointed leader. The three permanent units might be a Policy Analysis Group, a Research and Development Group, and an Evaluation Group. The temporary unit could be a group of theme managers who would each be responsible for coordinating the development of one of the R&D themes pursued by the Career Education Program. These theme managers might have a group leader (optional) who would report

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*For a discussion of matrix organization, see J. Wirt, *Organizational and Managerial Strategies for R&D Institutions*, The Rand Corporation, R-1159-HEW (forthcoming).

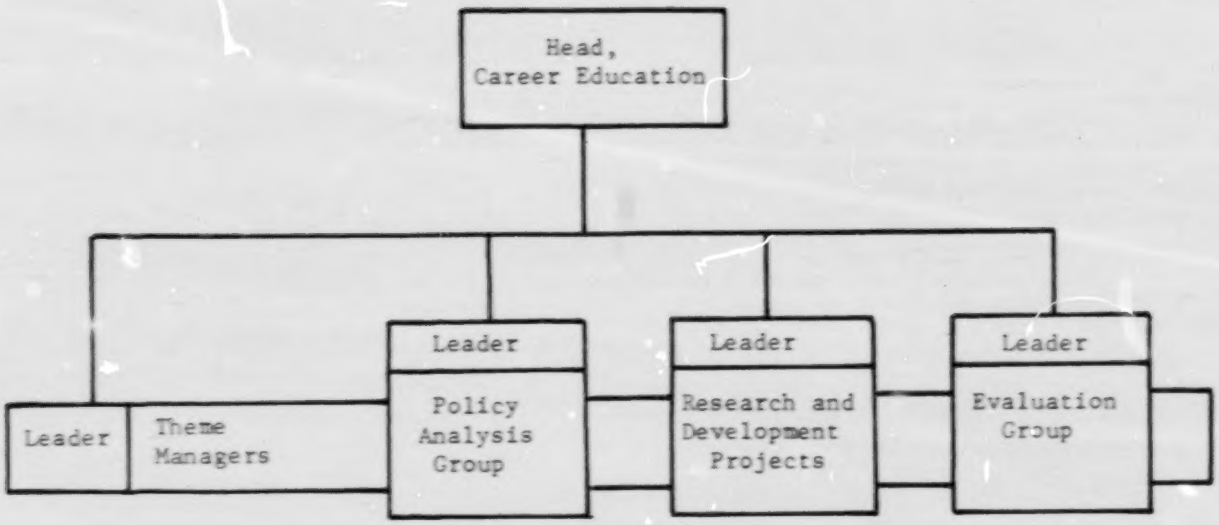

Fig. 3 -- Organizational structure for Career Education Program

directly to the Career Education Head. Each theme manager would have a budget to spend on extramural projects, either directly or through one of the three permanent groups. Large experimentation projects would probably be funded directly by the theme managers. The theme manager would draw most of his staff on a part-time basis from the three permanent groups, although a few staff for site management might be permanently assigned to the theme managers group.

The principal advantages of the matrix organization in this application are: (1) budget flexibility, (2) the quality of the coordination that can be provided, and (3) a high degree of expertise in each management style applied to major projects. Budget flexibility exists because, although the theme manager may spend a large amount of money during certain periods, he is not expected to acquire a large, permanent staff. Good coordination is provided by, in effect, having Career Education staff work for two work leaders, though this can sometimes produce tensions between the work leaders or between a staff member and his work leaders. The only way to avoid such difficulties is for top

management to devote considerable effort to the running of a matrix organization, the price to be paid for better coordination.

The matrix organization would not need to be highly formalized. The factors that are crucial to achieving a matrix organization for the Career Education Program are that (1) the three permanent group leaders would hire and (possibly) promote their own staff; (2) theme managers would not have higher stature than the permanent group leaders; and (3) themes would all be considered to have a temporary lifetime.

SOME STAFFING IMPLICATIONS

Throughout the discussion, there have been implications for staffing the Career Education Program. For greater clarity, some of these implications are summarized below.

Providing Analytical Capability

One of the more prominent recommendations appearing throughout this report is that the Career Education Program should have its own internal policy analysis capability. Two immediate questions are: How much capability is needed? How should it be organized?

An estimate on the level of capability needed is between five and ten man-years per year, assuming a $25 million budget for the Program. Less than five would probably be inadequate to deal effectively with the complexities and ambiguities of career education, and more than ten is probably unrealistic in the face of manpower ceilings.

Two organizational possibilities for providing policy analysis have already been discussed. Responsibility for conducting policy analysis can be given to a separate group in the Program (or in the NIE in liaison with the Program), or a share of the responsibility for conducting policy analysis can be given to each group within the Program. With the first alternative, policy analysis is managed somewhat independently of the remainder of the Program; with the second, each part of the Program conducts its own policy analysis. The first alternative is strongly preferred over the second, because policy analysis should be done with some independence from the ongoing concerns of the

remainder of the operation. Another organizational choice must be made in regard to the policy analysis staff: Should it work part-time, in which case the balance of the time would be spent in project management (proposal selection, project monitoring, and so on), or full-time? Again, our preference is for a full-time analytical staff. Doing policy analyses requires a special talent that is difficult to find. The same might be said for project management, and there are few who can do both project management and policy analysis well at the same time. Full-time employment of policy analysts and project managers, therefore, is probably a more efficient use of resources.

The recommendations on separating policy analysis from the remainder of the organization and assigning policy analysis personnel full-time do not conflict with the use of a matrix organization structure, since the analytical staff would do policy studies along both dimensions of organization: for the theme managers and for the policy analysis group leader. Caution should be exercised, however, to relate policy analysis tasks to priority Program concerns in order to avoid the tendency of analysts who are separated from operations to become too academic.

We have recommended that, in addition to internal policy analysis, some policy analysis be conducted externally--representing about 5 percent of the total extramural budget. Some of this 5 percent might be invested in the "core" grants recommended earlier; some might be in the form of direct project grants. None of the extramural activity should be managed by the internal policy analysis group in order not to jeopardize the independence of the extramural analyses.

Staff/Project-Dollar Ratios

At several points in our report, recommendations have been made concerning the number of staff needed to manage certain types of R&D. Table 3 provides a summary of our recommendations, based on management practices that have proved effective in other agencies* and that are applicable to the Career Education Program.

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*Among the agencies whose staffing practices we have examined are the Office of Education, Office of Economic Opportunity, National Science Foundation, National Institute of Dental Research, National Institute of Child Health and Human Development, National Institute of Mental Health, Office of Naval Research, and Goddard Space Flight Center.

Table 3

STAFF/PROJECT DOLLAR RATIOS RECOMMENDED FOR CAREER EDUCATION[a]

Type of R&D	Recommended Portion of Career Education Budget (%)	Recommended Budget (in $ millions)	Man-Years Recommended per $1 Million of Projects	Total Man-Years Needed
Research	10	2.50	1.0	2
Policy analysis				
Extramural	5	1.25	1.0	1
Intramural	--	---	---	5-10
Development	20	5.00	1.5	7
Experimentation	40	10.00	1.5	15
Evaluation	25	6.25	3.0	18
Total	100	25.00	2.0[b]	50

[a]Based on $25 million budget.

[b]Average.

The table reflects the fact that staffing levels are directly dependent on the amount of control desired over the content of an R&D project. Thus, research projects in which the priorities are set but the details of the methodology are not controlled are recommended as requiring one full-time professional staff person per $1 million of projects, a typical level for R&D agencies that exercise considerable influence on research priorities. Development and experimentation, which require more detailed management control, are recommended at a level of approximately three man-years per $2 million of projects; and evaluation projects, which typically require the most management attention, at yet a higher level. Assuming the staffing ratios given in the table and previously recommended budget proportions, it is estimated that the Career Education Program will need a minimum of 50 professionals to manage a $25 million budget well. Adequate support, both in auxiliary staff and in travel and consultant funds, will also be necessary. Where personal allotments do not permit optional staffing, it is sometimes possible, through astute management, to obtain the needed services through outside contracts at the expense of program funds.

General Considerations

Another staffing implication that has appeared frequently in this report is the importance of acquiring staff of the highest quality. Not much more can be said concerning this point than to emphasize that the more autonomy provided, the easier it will be for the Program to hire quality staff. As already pointed out, management procedures where peer panels decide what to fund and project managers simply implement their decisions, or where contract and other support staff all acquire real authority, undermine the accountability of program staff, and eventually take their toll in staff caliber and program quality.

* * * * *

One of the important principles of R&D management that has been implicit in most of the discussion in this section is that, given a limited number of staff members, the Program will have to make deliberate choices regarding the kinds of staff that are hired and how they are used. Emphasis on any one aspect of the R&D management process (program planning, project generation, project monitoring, and so on) necessarily will mean that less time and resources will be available for the other aspects. Uneven emphases may be legitimate, as pointed out, but should be by design, not by happenstance. The R&D management techniques recommended in this report are tools that should be carefully applied to achieve the ends of the Career Education Program.

Appendix

PROBLEMS OF ENTRY AND CAREER PROGRESSION

PROBLEMS OF ENTRY INTO THE WORK FORCE

Some of the possible problems of entry into the work force have already been noted in Section II. We elaborate them here for the reader's convenience. Each suggested problem serves as a hypothesis to be addressed by R&D activity and to be the focus for testing of alternative delivery systems or techniques to overcome a particular problem:

I. Lack of specific marketable occupational skills.
II. Lack of general skills and acceptable work attitudes.
III. Lack of credentials for work entry.
IV. Personal constraints prohibiting work entry.
V. Breakdowns in the matching of people and job opportunities.
VI. Conflicts between job aspirations and the realities of contemporary employment.

R&D at this problem level consists of identifying the individuals for whom these problems are relevant. In addition, R&D may suggest other problems as targets for career education.

As part of our conceptual analysis, each of these problems regarding entry is subdivided into hypotheses that form the objectives of alternative career education programs.

Problem I. Lack of Specific Marketable Occupational Skills

From the suggestion that entry problems occur because an individual lacks the marketable occupational skills needed, we derive a set of hypotheses relating to appropriate training experience. There are a number of possible causes associated with each hypothesis.

H1. Lack of Exposure to Training Programs. Five alternative reasons as to why an individual did not receive exposure to training programs are:

(1) Openings in training programs were not available.
(2) Openings were available, but the individual could not qualify for admission.
(3) Openings were available, but the individual could not afford to participate.
(4) The individual was not interested in participating in available programs.
(5) The individual did not know about the training experiences available to him.

Each of these hypotheses, in turn, can be used to form an objective of a career education program. Associated with each objective are alternative means of both action and research. In the case of lack of openings, an objective of career education may be simply to provide more spaces within these training programs so that this hypothesized reason no longer applies to persons with entry problems caused by lack of specific occupational skills. Three avenues may be used in approaching this objective: public provision of additional spaces in the training program, public encouragement of private provision of space within these programs, and private encouragement of private provision of spaces. Possibilities under the first alternative are:

- Public programs of specific occupational skill training.
- Use of public schools to deliver training for specific occupational skills (cf. Model I).

Under the alternative of public encouragement of private provision of space, possibilities are:

- Training vouchers funded by the local or federal government for participation in training programs.
- Public agents responsible for the placement of the unemployed into training programs.
- Subsidies or tax incentives to private training programs for the provision of additional space.

Under the alternative of private encouragement of private provision of space, possibilities are:

- o Cartelization of private programs to raise profits and incentives, through revision of the Sherman Act.
- o Trade regulation of private vocational schools to force them to lower prices.

For individuals that could not qualify to participate in training programs, the following career education options are possibilities:

- o Remedial programs to bring unemployed applicants up to qualification standards for existing training programs (cf. Model IV).
- o Public provision of new programs with less ambitious objectives and qualifications for enrollment.
- o Education, persuasion, or inducement to influence training programs to change their standards for qualification in order to enroll more of the unemployed.

For individuals that did not receive adequate exposure to training experiences because they could not afford to participate in available programs, the following are career education possibilities:

- o Subsidy programs whereby trainees are supported during their training.
- o Provision of training experiences at convenient times and places that would permit an employed person to participate.
- o Work-training programs that permit trainees to work at least part-time and thus receive some wages.

For individuals who are not interested in participating in training programs, there are career motivation programs of various kinds, including role models, special curriculum programs (cf. Model I), school guidance (cf. Model I), and incentives or sanctions programs. Examples of incentives and sanctions are opportunities for cash prizes or assurances of jobs after completion of training, or training requirements associated with welfare programs.

Finally, for those lacking exposure to training simply because they were not aware of available opportunities, there are information programs to focus on the availability of alternative public and private training for specific occupational skills (cf. Model III).

For all these possibilities, R&D activity may be devoted to determining the number and kinds of people for whom these hypotheses are true, the relative advantages and disadvantages of the proposed program objectives related to each hypothesis, and the effectiveness of alternative program means to meet each of these career education objectives. Clearly, the answers will require activities spanning the range from basic research to experimentation with ways of delivering the requisite skills.

H2. Lack of Skill Acquisition. An alternative hypothesis to absence of exposure to training experiences is that despite exposure or participation, skill acquisition never occurred. In this case, the focus of the hypothesis is on the failure of the training programs to provide job seekers with the specific skills that they need. Alternative hypotheses at the next level of detail examine possible related causes and indicate alternative career education objectives:

(1) Individuals lacked the ability to acquire the specific skills for which they were to be trained.
(2) Individuals were enrolled in training programs, but were not motivated sufficiently to acquire the needed skills.
(3) Ineffective instruction or poor curricula was the cause of nonacquisition of skills (cf. Models I and II).

(4) External factors such as poor health, disability, or poor attendance caused nonacquisition of skills.

Again, each of these hypotheses has associated with it alternative program possibilities that may be listed in terms of career education objectives.

In the case of lack of ability, possible objectives are:

- o Improved placement in training programs with respect to individual ability.
- o Providing remedial programs where needed to individuals already enrolled in training programs.
- o Altering the curricula of training programs to simplify skill acquisition.

For individuals who were not sufficiently motivated by training programs in which they were enrolled, career education may focus on:

- o Development of incentives for skill acquisition, such as opportunities for cash payments or guaranteed jobs associated with performance levels.
- o Development of programs for improving the motivation to learn through relevant training experiences for work-force entry; for example, employer-based motivation programs, work-study programs, placement of stimulating training instructors, and more general career motivation programs sponsored either in school or as part of the training experience (cf. Model I).

Ineffective instruction and poor curricula suggest their own objectives for R&D in career education, although the means by which objectives may be reached (e.g., individualized instruction, curriculum reform, changes in instructional staff, reorganization of school

calendars to permit work experience) are themselves topics of research.*

Finally, problems caused by external factors inhibiting learning can be addressed by investigating possibilities for compensatory programs, or by identifying the range of possible causes outside the career education spectrum.

H3. Skills That Are Not Marketable. A third alternative hypothesis to the lack of appropriate, specific occupational skills among those seeking entry to the work force is that the skills received within training programs are not marketable. This may mean that:

(1) The skills are simply no longer wanted.
(2) The individual lacks the appropriate placement ability to put his occupational skills to use (cf. Model IV).

In the former case, career education efforts may be directed toward:

- Updating training program content and instruction (cf. Model II).
- Altering training programs to provide more generalized skills less subject to either obsolescence or narrow usage (cf. Model I).

In the latter case, career education may focus on including or improving the acquisition of placement skills as part of specific skills of training.

For all these hypotheses, R&D activity is needed to identify the types of individuals for whom the hypotheses apply and the most effective ways for achieving the implied objectives.

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*Indeed, the Models I and II projects currently supported by the NIE Career Education Program address items (3) and, to some extent, also (2) and (4). There is little evidence, however, that the approaches being taken are in any way based on research and extant development.

Problem II. Lack of General Skills and Acceptable Work Attitudes

Throughout the above discussion we have focused on the hypothesis that individuals encountered entry problems because they lacked specific marketable occupational skills. But alternative reasons may be suggested as to why entry problems occur. Research devoted toward these alternative hypotheses may also be pursued in relation to the entry problem. One alternative hypothesis is that individuals lack the general skills and attitudes required for entry despite their having the appropriate specific occupational skills. By "general skills," we mean the reading and mathematical abilities commonly obtained through the public educational system. By "acceptable attitudes," we mean those work-related attitudes necessary for functioning on the job without occurrence of high absenteeism and poor work habits. Three alternative hypotheses are included in this analysis as possible causes for the lack of these general skills and attitudes.

H1. Dropped Out of the General Education System. At least three additional hypotheses offer explanations for why individuals may have dropped out of the general education system. One explanation is that they simply could not afford to continue with their public training. In this case, a career education program may seek to prevent departure by developing:

- o A voucher program to provide support to keep individuals within the public school system.
- o Alternatives to the general education system such as correspondence courses.

A second hypothesis to explain departure is that individuals may have become disenchanted with the general education system as they experienced it. For these individuals, career education programs may seek to motivate students to remain within the system by offering:

- o Role models and other general career motivation programs (cf. Model I).

- o Alternatives to the general education system such as correspondence courses (cf. Model II).
- o Counseling and guidance both within school and outside school to prevent departure.

A third hypothesis is that individuals may have departed from the general education system because they were expelled. For these individuals, career education programs aimed at counseling and guidance, career motivation, and alternatives to the general education system also apply.

H2. Remained but Did Not Acquire Marketable Skills. For individuals who completed their formal education but still failed to acquire the general skills and attitudes for work-force entry, at least three supporting hypotheses are suggested as potential causes. The first is that individuals may have lacked the ability to acquire these general skills. For these people, career education programs may be directed toward:

- o Remedial education programs for acquisition of general skills.
- o Diagnosis and counseling for individualized instruction.
- o Alteration in policies of school placement.

The second and third possibilities are that individuals may have become disenchanted with the education system even though completing their education, or ineffective instruction or poor curricula resulted in the failure to acquire the requisite general skills. For both these hypotheses, career education objectives and programs have already been suggested on p. 109.

H3. Acquired Poor Work-Related Attitudes. For individuals who lack the proper work-related attitudes, the first supporting hypothesis is that lack of exposure to work experiences resulted in improper work attitudes leading to work-force entry problems. For these individuals, career education programs may focus on:

- o Role models.
- o Work-study programs.
- c Increasing the relevance of school work to work experiences.
- o Providing education at work site instead of at school (cf. Model II).

Alternatively, poor work-related attitudes may be caused by discouraging work experiences. In this case, career education programs may include:

- o School guidance and placement into work-study programs.
- o School-controlled work-study programs.
- o Improving private or public (nonschool) matching services (cf. Model III).

Finally, poor work-related attitudes may result simply from unrealistic expectations of work opportunities. In this case, career education programs may focus on:

- o Exposure to role models, in or out of school (cf. Model II).
- o Early exposure to work experiences, in or out of school (cf. Model II).
- o Guidance and counseling, in or out of school.
- o Informational programs for parents.

For all these hypotheses, as for those dealing with occupational skills, R&D activity is needed to determine the individuals for whom these hypotheses apply, the set of career education objectives that seems most appropriate for the population groups most affected, and the relative effectiveness of alternative program means to meet each of these educational objectives.

Problem III. Lack of Credentials

A third major problem of work entry is that individuals, though equipped with proper general skills and attitudes and marketable, specific occupational skills, may lack the appropriate credentials for obtaining the positions they seek. Credentials in this context refer to diplomas, membership in unions, and the like. If individuals are unable to gain the required credentials because they lack the skills to acquire them, then all those career education hypotheses listed above that are relevant to skill acquisition may pertain. On the other hand, career education programs may focus on two other supporting hypotheses: lack of alternative sources of credentials, and unrealistic credential requirements. To provide alternative sources of credentials, career education may focus on:

- o High school graduate equivalency tests and other credential-granting programs.
- o Programs to provide alternative means to meet credential requirements (cf. Model IV).

In dealing with unrealistic credential requirements, programs may also be developed to provide:

- o Modified credential requirements brought about by developing entry-level jobs into paraprofessional positions.
- o Improved entry testing and placement procedures.

Problem IV. Personal Constraints

Work-force entry may also be prevented by the presence of personal constraints. Two hypotheses relating to this problem focus are care of dependents and poor health or disability. In the former case, programs may focus on at least three potential avenues for removing the personal constraint to work. Dependencies prohibiting work-force entry may be removed directly through programs of:

- o Public care for dependents.
- o Vouchers providing funds for care of dependents.
- o Local government or community cooperatives for care of dependents.
- o Provision of dependent care at places of employment.

Second, programs may focus on work at home by:

- o Providing wage subsidies to supplement work-at-home employment.
- o Encouraging employers to initiate work-at-home opportunities.

Poor health or disability prohibiting work-force entry may be handled through:

- o Therapeutic programs for rapid recovery.
- o Job adjustments to compensate for physical handicaps.
- o Incentives to employers for hiring the disabled.

Each of these possible approaches to work-force entry improvement may be considered either inside or outside the realm of career education. If included, R&D should be conducted to determine how career education programs may best meet these objectives, and for whom they may be applied.

Problem V. Breakdowns in the Matching Processes

Despite adequate skills and attitudes, credentials, and freedom from personal constraints, individuals may still be prohibited from work-force entry by a breakdown in the market system matching job opportunities with job seekers. This breakdown may be caused by market inefficiencies in the provision of information regarding job opportunities to those who seek them, or by restrictions on the mobility of job seekers that preclude their obtaining positions open to them.

H1. Inadequate Information on Job Opportunities. Information obstacles may be attacked directly by career education programs. One underlying hypothesis is that information services on job and training opportunities are poor. In this context, programs that may be appropriate are:

- o Government-provided job banks for information and guidance.
- o Government support for private employment agencies and job agents.
- o Employer-financed information activities.
- o Expansion of school (college) guidance and counseling.

A second hypothesis is that services are adequate but individuals are unaware of them or do not have access to them. Possible programs in response to this hypothesis are:

- o Government-sponsored job banks.
- o Government-funded dissemination agents.
- o Public or private dissemination systems (cf. Model III).

An alternative hypothesis suggests that lack of information concerning job opportunities is caused by the lack of financial resources of job seekers to enable them to utilize existing information systems. In this case, an approach toward solution might be to finance toll-free call numbers to job banks or existing employment agencies (cf. Model III).

Lack of mobility may also prohibit work-force entry. This hypothesis may be subdivided according to two different types of constraints. The first involves limitations on geographic movement, and the second, limitations on movements across occupational boundaries.

H2. Lack of Geographic Mobility. Constraints to geographic movement may be financial. Appropriate remedies may be:

- o Moving vouchers.
- o Tax remissions based on moving to new job sites.

Geographic movement may also be affected by psychological limitations, e.g., uncertanity regarding new places, or by a sense of personal attachment to family or friends within the current location. Employment programs dealing with these obstacles may include:

- o Programs to guarantee jobs in new areas (cf. Model IV).
- o Public and private agencies to help with housing and other adjustments to new environments.

In all the mobility problems hypothesized above, career education can play only a marginal role. However, for most career education programs, the reduction of financial and psychological limitations to mobility must be considered as objectives.

H3. Limitations to Occupational Mobility. Greater emphasis on career education may also be given to programs seeking to remove limitations of mobility across occupational boundaries. In certain cases, these boundaries may be formal, as developed by employers or unions and other trade associations. In these cases, the analysis under the subsection entitled "Lack of Credentials" (p. 114) is appropriate. Other programs may focus on the uncertainty concerning alternative occupations and industries, and a sense of occupational affiliation that may limit occupational mobility. Possible approaches in this case are:

- o Informational programs on alternative occupational work opportunities.
- o Programs of exposure and orientation to alternative occupations (cf. Model IV).

Problem VI. Conflicts between Aspirations and Reality

Our last work-force entry problem suggests that some individuals fail to enter the work force because they are dissatisfield with entry opportunities. In many cases, existing opportunities consistent with skill levels may be intrinsically undesirable, and in these cases, career education programs focusing on increasing the skills and, thus,

the available opportunities of work-force entry apply. Actually, alteration of the entry opportunities is probably outside the capability of career education programs, yet career education might encompass the education of employers so that they will eliminate characteristics of jobs perceived by potential applicants as highly undesirable, e.g., poor work environment, discrimination both in hiring and on the job, restrictions on advancement, and short career ladders.

An alternative cause of dissatisfaction, however, is the unrealistic expectations of entry applicants. This is an area where the knowledge base is especially weak and where the focus of research might extend beyond initial job-entry attitudes to include the entire spectrum of topics related to work behavior and ethic. *For all these hypotheses within the domain of work-force entry problems, it is necessary to determine for whom these problems exist and by what means they may best be overcome.*

PROBLEMS OF CAREER PROGRESSION

The second major domain of R&D activity is related to advancement within the work force. Programs in this area should be concerned with diagnostic, preventive, and therapeutic measures for general problems of low-income careers, lack of advancement opportunity, and resulting dissatisfaction of employed workers. As in the domain of work-force entry, this area may be divided into several major problems to be explored:

I. No advancement opportunities may be present within current employment sectors.
II. Advancement opportunities may exist, but individuals holding low-income or otherwise unsatisfactory jobs may lack the skills to capture these opportunities.
III. Individuals may have the skills, but lack the requisite credentials for advancement.
IV. Individuals may lack the information needed to locate advancement opportunities, or the mobility required to obtain them.

Although these suggested problems are very similar to ones suggested under the domain of work-force entry, both the content and target populations of related programs would be quite different.

R&D is needed at this point to identify the exact populations for which these two different problems of entry and advancement are relevant. Additionally, R&D as indicated below would seek to find alternative means for providing these population groups with solutions to their employment-related problems.

Problem I. Lack of Opportunity for Advancement

For the first major problem, which suggests that advancement opportunities may be nonexistent in some market sectors, career education may contribute by:

- Providing individuals with the appropriate skills and attitudes so that they may leave "dead-end" job positions and reenter the work force, taking a position with greater potential for advancement (cf. Model IV).
- Encouraging employers to redefine jobs to provide advancement possibilities.
- Improving job placement so that individuals do not have to accept jobs with little opportunity for advancement.

Problem II. Lack of Skills

As in the problem of entry, lack of advancement opportunities caused by lack of skills required for advancement may develop from at least two alternative situations. The first hypothesis is that individuals lack exposure to the training required for advancement. Lack of exposure may be the result of a number of causes, each indicating a possible avenue for career education programs: lack of openings in training programs, individuals being unable to afford or qualify for programs, or lack of knowledge about how to acquire training for advancement. Many of the career education possibilities suggested earlier in the discussion on entry problems apply here, for example:

- o Correspondence courses.
- o Night school programs.
- o Vouchers or other government subsidies to cover training costs.

The second hypothesis is that individuals, though exposed to training, did not acquire the necessary skills. Training deficiencies may be remedied either by on-the-job training programs or by programs commonly found in public and private educational institutions.

R&D activity directed toward the development of programs oriented toward advancement opportunities is needed. Consideration must be given to the differences in populations, personal constraints, and past experiences of those seeking advancement and of those seeking initial entry into the work force.

Problem III. Lack of Credentials

Lack of credentials such as a college degree would suggest additional career education targets similar to those suggested for the problems of entry, yet oriented differently toward the problems and concerns of the populations actually suffering from lack of advancement. Approaches within this context may include:

- o Programs for employers to help them eliminate credential requirements blocking advancement of skill-qualified individuals.
- o Redefinition of employment positions and the establishment of paraprofessional positions in which credentials are not required.
- o Programs to finance or encourage agencies (public and private) to provide information and guidance on the acquisition of needed credentials through public education programs (cf. Model III).
- o Programs to encourage acquisition of credentials in alternative ways, such as through correspondence courses or government-accredited credential programs (cf. Model III).

Problem IV. Lack of Information on Advancement Opportunities or Mobility Needed To Accept Them

Obstacles to advancement related to the lack of information concerning opportunities or the limitations on mobility--across either geographic regions or occupational or industrial boundaries--may be addressed in ways similar to those suggested within the domain of work-force entry. However, the internal labor market must be given much greater consideration in dealing with movement and advancement within the work force. In contrast to the domain of work-force entry, little is known concerning the numbers of people affected by advancement problems. Nor do we know the extent to which the nation suffers from employee dissatisfaction which occurs because individuals are blocked from attaining positions that are more fulfilling or that provide greater opportunities for income growth.

The first R&D task in this area is to develop the proper data to use in defining population groups for which the suggested career education possibilities may be helpful. Furthermore, extensive R&D is required to test the major hypotheses and subhypotheses concerning the potential reasons for advancement obstacles and the effectiveness and desirability of alternative means by which these obstacles may be removed.

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